SHIELD ENGINEERING, INC.

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SOLID WASTE SECTION
ASHEVILLE REGIONAL OFFICE

February 8, 2008

Mr. Stan Steury
Program Manager
ASU Energy Center
Appalachian State University
130 Poplar Grove Road Connector
Boone, North Carolina 28608

Reference: Methane Extraction Test – PO #0003227
Former McDowell County Landfill
Transfer Station Permit #5602T

Dear Mr. Steury:

Shield Engineering, Inc. (Shield) is pleased to submit this letter report summarizing our work related to the findings associated with the initial methane field investigation, the installation of the three methane extraction wells, and the subsequent execution of a methane extraction test on the former McDowell County Landfill. Shield was subcontracted by Appalachian State University (ASU) Energy Center to install three methane extraction wells and perform a methane extraction test for a period of 48-hours. In so doing, Shield had proposed a preliminary investigation of the landfill to determine the optimum locations for the three proposed methane extraction wells.

The former McDowell County landfill is located adjacent to a permitted Transfer Station referenced above, just off NC Highway 226, south of the I-40. This landfill was operational during the 1970s through to final closure in 1994. ASU recently approached McDowell County in regard to assessing the methane potential at this landfill for possible use as a source for renewable energy for businesses located in the area around the landfill.

The preliminary investigation proposed by Shield consisted of performing a series of Geoprobe boreholes to determine the presence of methane immediately below the landfill cover. These 68 boreholes were laid out on an approximate 100' x 100' grid pattern as shown on Figure 1. The landfill cover was found to consist of tan micaeous fine to medium sandy silt and exhibited varying thicknesses across the landfill, ranging from 2 up to 10 feet thick. The average thickness of the landfill cover is 4.1 feet. A map of the landfill cover thickness is shown on Figure 2. The landfill cover thickness was thinner along the southern side of the landfill (see Figure 2).

Following the completion of each of the borings the percentage of methane in air was measured using a LandTec GEM-500 portable gas analyzer. The percentage of methane in air readings for the former McDowell County Landfill is shown on Figure 3. The percentage of methane in air ranged from 3.8 to 64.8% across the landfill, with an average methane percentage of 40.7%. Following the recording of each methane measurement, each borehole was backfilled with a bentonite slurry mix to seal the landfill cover.

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The waste found in these borings, beneath the landfill cover, ranged from paper, textiles, wood, cardboard, plastic, foam rubber, asphalt, concrete, etc. The most commonly encountered waste in these borings was plastic, paper, and wood debris. Based on the methane readings collected from these shallow borings, three locations were proposed to ASU for the installation of a methane extraction well. With ASU concurrence these three sites were selected for the installation of a methane extraction well.

The three methane extraction wells were drilled by Kellett Drilling of Simpsonville, South Carolina from December 14 to 18, 2007. These three extraction wells were drilled as a 36-inch diameter borehole, with a 6-inch diameter perforated PVC screen installed to the total depth with a PVC casing up to ground surface. The methane extraction wells installed were labeled from MDW-1 through MDW-3 and their locations are shown on Figure 3. The waste encountered in these three extraction wells consisted of a mix of paper, wood, textiles, plastic, etc. There was preponderance of textile material in the form of spools of thread immediately below the landfill cover at MDW-2. Additionally, there was appreciably more plastic (e.g., IV bags) found in MDW-3 compared to the other two wells.

Each methane extraction well was drilled down to a total depth at the water table for each of the locations shown. The total depth at MDW-1 was 47 feet below ground surface. The total depths at MDW-2 and MDW-3 were 33 and 31 feet below ground surface, respectively. The depth to ground water in MDW-1 was 34 feet below ground surface, in MDW-2 the depth to ground water was 21 feet, and 13 feet in MDW-3. The top of the perforated casings were about 7 feet below ground surface. A two-foot thick bentonite seal was installed about two feet above each of the PVC screens and then a second bentonite seal was installed at a depth corresponding to the bottom of the landfill cover at each location. The landfill cover in northern area of the landfill at MDW-1 was about 5 feet, MDW-2 about 4 feet, and MDW-3 is about 2 feet.

The methane extraction test was setup with temporary flexible vacuum hoses running along the top of the landfill ground surface from each of the three extraction wells to a central location near MDW-2, where a skid-mounted vacuum pump and generator were located. Each of the dedicated vacuum hoses was combined at a manifold, next to the vacuum pump equipment. The manifold included vacuum gages and valves. A knock-out tank was included at the inflow point to these two units. Each methane extraction well was equipped with a LandTec Accu-Flow Wellhead. These wellheads were designed to reduce the gas flow from a 6-inch diameter well down to a 2-inch pipe with an access port for measuring the gas flow rate and simultaneously allowing the collection of the methane gas data using a LandTec GEM-500 gas analyzer.

The methane extraction test commenced at 10:30 a.m. on December 19, 2007 and was continued through a methane recovery phase ending at 1:40 p.m. on December 21, 2007. Since the optimum vacuum and methane extraction rates for this landfill were unknown, the test was commenced with a vacuum of 65 inches of water at the vacuum pump. Due to inherent line losses and friction losses, the wellhead vacuums ranged from 31 to 33 inches of water as shown in Table 1. The methane percentage was monitored at each extraction wellhead throughout the test. Additionally, the gas flow rate, other gas percentages, thermal value of gas, and temperature were also monitored through out the methane extraction test. These data are exhibited in Tables 2 through 4 for each of the methane extraction wells. The gas flow rates for the duration of the methane extraction test for each methane extraction well are shown in Figure 4. The mix of different gases during the methane

extraction test is shown for each extraction well for the duration of the test on Figures 5 through 7. The component labeled "other gases" shown on Figures 5 through 7 consist of nitrogen, ammonia, alcohols, hydrogen, volatile organic compounds, and other miscellaneous trace gases.

Unfortunately, the vacuum to each of the wellheads was impacted due to freezing of moisture within the vacuum lines causing blockages along these lines during the night of December 19-20, and especially in the early morning of December 20, 2007 as evidenced in Table 1 and Figure 4. The vacuum readings on the pump and at each of the wellheads started rising at midnight and continued to rise to a peak value in the early morning. The ice blockages were dislodged from the vacuum lines in the early morning, and the vacuum line to MDW-3 had to be completely broken down into separate hose lengths in order to dislodge the ice. The complete system was able to get back to a stable equilibrium after 11:00 a.m. Subsequently, the system was able to maintain stable conditions for the remainder of the test (see Figure 4). Table 1 includes the average vacuum pressures for the stable portion of the extraction test from 1:30 p.m. through to the following morning of December 21, 2007. The data for each of the methane extraction wells (see Tables 2 through 4) also exhibit stable conditions from 1:30 p.m. through to the following morning of December 21, 2007 for the methane extraction test. Average values for the main parameters are exhibited at the bottom of each table for this period of time. Hence the average vacuum pressures at the wellhead for each of the extraction wells ranged from 40.2 to 42 inches of water.

The methane extraction test did attain a good steady state condition for the last 18 hours of the test (see Figures 5 through 7). As a result the vacuum pump was discontinued at 8:00 a.m. December 21, 2007 in order to assess the rebound conditions for the landfill in terms of attaining previous methane production rates following the shutdown. The rebound conditions of each extraction well are evident in Figures 8 through 10. Methane Extraction Well MDW-1 attained similar methane production rates 5 hours after shutdown, MDW-2 took 6 hours, and MDW-3 took about 5 hours. The average methane production in MDW-1 for the latter portion of the test was 17% of methane in air at a flow rate of 40 standard cubic feet per minute (scfm). The average methane production in MDW-2 for the latter portion of the test was 3.7% of methane in air at a flow rate of 53 scfm. The average methane production in MDW-3 for the latter portion of the test was 1.5% of methane in air at a flow rate of 65 scfm. Varying leakage or short-circuiting from the atmosphere into each of the methane extraction wells was evident based on the oxygen data for the three extraction wells. The landfill cover was a fine to medium sandy silt which also varied in thickness across the landfill. Such a soil is relatively pervious and the thickness of unsaturated waste capable of producing methane decreased in each extraction well, from MDW-1 through to MDW-3. The results of the methane extraction test indicate that the vacuum pressures were higher than ideal for the specific situation at the McDowell County Landfill. As required within the original request for proposal (RFQ), the methane extraction test was conducted as a constant-rate test and not as a stepped vacuum test. Therefore, once the test commenced the system variables were maintained as much as possible at the same constant settings. However, based on our review of the test data, if the test was run as a variable rate test that would have enabled the variation of the vacuum at each of the wellheads. Thus, the gas flow from the wells would have been fine-tuned so that they would be commensurate with their ability to produce methane at higher percentage rates of methane in air at lower flow rates.

An air sample was collected on the evening of December 20, 2007 and shipped to Research Triangle Park Laboratories, Inc for analysis of siloxanes, volatile organic compounds, methane,

hydrogen, carbon dioxide, nitrogen, oxygen, reduced sulfur, hydrogen sulfur and sulfur compounds. The results of this analysis are attached. The siloxanes are important in regard to wear and tear on using electrical generating engines such as microturbines or reciprocating engines. Numerous manufacturers are now requiring the removal of siloxanes in the application of their engines for power generation, otherwise warranties may be voided. Only one siloxane (octamethylcyclotetrasiloxane - D4) was identified in the air sample at a concentration of 14.8 parts per billion per 20 liter volume (ppbv). This concentration is low compared to some of the engine warranty requirements. Typically the D4 siloxane is the largest contributor to the total siloxane concentration, and landfills with older wastes usually have lower siloxane concentrations. Other constituents that were identified were hydrogen sulfide at a concentration of 2.4 parts per million per 20 liter volume (ppmv) and numerous volatile organic constituents (see attached analytical laboratory report).

The power production potential for each methane extraction well is shown on each of Tables 2 through 4. The power production variation over the duration of the methane extraction test is shown for each of the extraction wells in Figures 11 through 13. The power potential as measured during the latter stable portion of the test was 124 kilowatts for MDW-1, 35 kilowatts for MDW-2, and 17 kilowatts for MDW-3. A combination of thin landfill cover and less unsaturated thickness of waste contributed to the variation of power potential for these three extraction wells.

A review of the former McDowell County Landfill was made in the context of methane percentage measured under the landfill cover (see Figure 3) and cover thickness (see Figure 2) in order to identify optimum areas of the landfill for possible development of a methane collection and extraction system. The area slated for possible development of a methane collection and extraction system is outlined on Figure 14. An area of approximately 8 acres was identified for exploitation of the potential methane resources within this landfill. Based on the literature (well spacing ranges upward from 200 feet) and the EPA assumption for their interactive landfill gas model of one well per acre (equivalent to a well spacing of 210 feet) a methane collection system is feasible at this landfill consisting of a total of 9 methane extraction wells. Hence, if the decision was made to proceed with methane recovery, Shield would recommend a series of 7 additional methane extraction wells for installation at the landfill at the locations shown on Figure 14. The optimum vacuum for operating such a methane collection system would be about 60 inches of water, with vacuum reducing valves at each wellhead in order to optimize the methane percentages with lower gas flow rates from each well. This setup would permit the fine-tuning of the system, so that the operation of the vacuum system is commensurate with the ability of the waste in the vicinity of the respective well locations to sustain a flow of methane and simultaneously maintain as high a methane percentage as feasible. In so doing this optimization of methane flow from each extraction well will permit system operations to compensate for both the limited thicknesses of the unsaturated waste, especially in the southwestern area of the landfill (i.e., as evidenced in MDW-2, and particularly in MDW-3) and the poor confining capabilities of the landfill cover.

The potential power production from a series of 9 methane extraction wells located the former McDowell County Landfill may be estimated from the power production rates exhibited during the methane extraction test from MDW-1 and MDW-2. Therefore, assuming that about five of the extraction wells are capable of producing at least 100 kilowatts each and the remaining four extraction wells are capable of producing about 30 kilowatts each, then the total power production

from the proposed methane collection system would be as much as 620 kilowatts. This power is equivalent to 105 scfm of 33% methane gas in air or 35 scfm of 100% methane gas.

The projected demand in the vicinity of the landfill is approximately 21 scfm of methane gas for 10 years for International Timber & Lumber, Inc. (ITL), and 30 scfm of methane gas for a proposed animal processing facility. Hence, assuming these projected demands are constant, the estimated methane production from the proposed methane extraction well network will be capable of meeting the demand for either ITL or the proposed animal processing facility. The capability of the proposed methane extraction system to meet both of the projected demands is dependent on the gas demand schedule for ITL and the proposed animal processing facility.

We sincerely appreciate the opportunity to provide you with this submittal. Should you have any questions, please contact Dave Wallace either by telephone at (704)-394-6913, facsimile at (704)-394-6968 or e-mail at dwallace@shieldengineering.com.

Sincerely,

SHIELD ENGINEERING, INC.

J. David Wallace, P.E.
Senior Engineer

Mark C. Boland, P.E.
Principal Engineer

cc: Mike Gladden - Public Works Director (McDowell County)
Larry Frost – Solid Waste Section, NCDENR

Attachments: Tables 1 through 4
Figures 1 through 14
RTP Analytical Report

TABLE 1
Methane Extraction Test Vacuum Pressures
Methane Extraction Test
Former McDowell County Landfill
Shield Project #1070249

Time	Date	Vacuum Pump Pressure (inches of Water)	MDW-1 Well-head Vacuum Pressure (inches of Water)	MDW-2 Well-head Vacuum Pressure (inches of Water)	MDW-3 Well-head Vacuum Pressure (inches of Water)
10:47	12/19/2007	65	32	31	33
11:03	12/19/2007	65	32	31	33
11:24	12/19/2007	65	32	31	33
11:50	12/19/2007	65	32	32	33
12:20	12/19/2007	65	32	32	33
12:45	12/19/2007	65	32	32	33
13:13	12/19/2007	66	32	32	34
13:48	12/19/2007	65	33	32	34
14:25	12/19/2007	65	33	32	34
14:55	12/19/2007	65	33	33	34
15:55	12/19/2007	65	33	32	34
16:50	12/19/2007	65	33	33	34
17:50	12/19/2007	66	35	34	36
18:50	12/19/2007	67	36	34	34
19:50	12/19/2007	66	35	34	35
20:50	12/19/2007	66	36	33	35
21:50	12/19/2007	67	36	33	34
22:50	12/19/2007	68	35	34	34
23:50	12/19/2007	68	37	37	38
1:00	12/20/2007	70	48	48	50
1:53	12/20/2007	72	55	55	58
2:57	12/20/2007	72	55	55	58
3:53	12/20/2007	72	55	55	55
4:51	12/20/2007	72	55	55	57
5:51	12/20/2007	72	55	55	56
6:53	12/20/2007	72	55	55	56
7:50	12/20/2007	72	55	55	56
8:50	12/20/2007	73	58	58	60
9:58	12/20/2007	76	73*	74*	75*
10:45	12/20/2007	72	62	63	--*
11:45	12/20/2007	65	40	40	43
12:50	12/20/2007	64	40	40	42
13:45	12/20/2007	64	40	40	42
14:45	12/20/2007	64	40	40	42
15:45	12/20/2007	64	40	40	42
16:50	12/20/2007	64	40	40	41
17:50	12/20/2007	64	40	40	41
18:50	12/20/2007	64	40	41	42
19:50	12/20/2007	64	41	40	41
20:50	12/20/2007	65	40	40	43
21:50	12/20/2007	65	40	40	43
23:50	12/20/2007	65	41	40	42
0:50	12/21/2007	65	41	40	42
1:51	12/21/2007	65	41	40	42
2:51	12/21/2007	65	41	40	42
3:50	12/21/2007	65	41	40	41
4:52	12/21/2007	65	41	40	41
5:54	12/21/2007	65	41	40	42
6:53	12/21/2007	65	42	41	43
7:50	12/21/2007	65	42	42	44
Average Values for Period from 13:45 (12/20) to 7:50 (12/21)		64.6	40.7	40.2	42.0

NOTES:
* Ice Blockages in Vacuum Lines

TABLE 2
Methane Extraction Well MDW-1
Methane Extraction Test
Former McDowell County Landfill
Shield Project #1070249

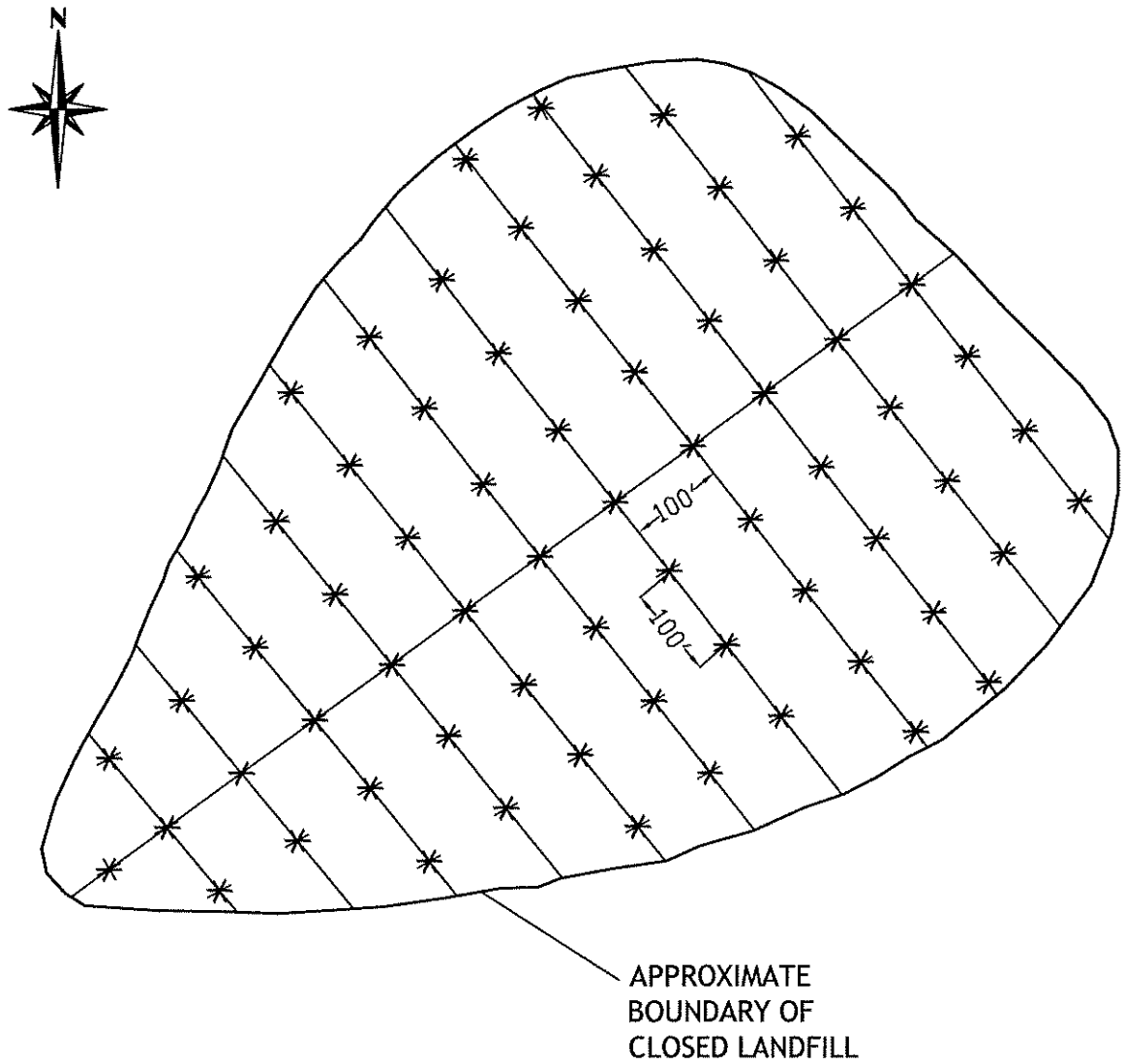
Time	Date	Methane	Carbon Dioxide	Oxygen	Gas Balance	Static Pressure (inches of Water)	Differential Pressure (inches of Water)	Temperature (^{0}F)	Corrected Gas Flow Rate (scfm)	Energy (kW-Hour)	Power (kilowatts)
		(Percentage of gas in air)									
10:34	12/19/2007	41.8	32.7	6.3	19.2	-20.9	0.43	70	39	4.83	290
10:51	12/19/2007	27	19.3	12.2	41.5	-22.9	0.36	70	36	2.88	173
11:11	12/19/2007	24.9	17.8	12.2	45.1	-23.3	0.68	71	50	3.69	221
11:30	12/19/2007	24	17.1	12.2	46.7	-23	1.17	71	67	4.77	286
12:07	12/19/2007	23.8	16.8	13.1	46.3	-13.8	0.96	70	62	4.38	262
12:31	12/19/2007	23.2	16.3	12.9	47.6	-23	0.35	70	35	2.41	144
13:04	12/19/2007	22.8	16.2	12.6	48.4	-21.6	1.46	70	75	5.07	304
13:31	12/19/2007	22.4	15.9	12.9	48.8	-23.1	0.37	70	36	2.39	143
13:59	12/19/2007	22.2	15.9	13	48.9	-24.6	0.61	70	47	3.09	186
14:31	12/19/2007	22	15.8	13.1	49.1	-22	0.35	70	35	2.28	137
15:33	12/19/2007	21.9	16.1	13.1	48.9	-22	0.15	69	22	1.43	86
16:32	12/19/2007	21.2	15.6	13	50.2	-24.8	0.21	69	26	1.63	98
17:31	12/19/2007	21.1	15.9	13.3	49.7	-25.1	0.37	68	36	2.25	135
18:30	12/19/2007	20.9	16	13.5	49.6	-26.4	0.68	69	65	4.03	242
19:36	12/19/2007	20.5	15.9	13.9	49.7	-25.9	1.74	68	81	4.92	295
20:35	12/19/2007	21.5	16.4	13.3	48.8	-19.2	0.76	69	53	3.38	203
21:29	12/19/2007	20.9	16.4	13	49.7	-23	0.68	68	50	3.10	186
22:37	12/19/2007	19.3	15.4	14.3	51	-21.8	1.01	68	62	3.55	213
23:36	12/19/2007	20.1	16.2	13.2	50.5	-24.9	0.46	67	40	2.38	143
0:41	12/20/2007	13.5	11.2	15.5	59.8	-19.8	-0.98	66	0	0.00	0
1:35	12/20/2007	19.2	15.7	13.7	51.4	-11	0.14	64	22	1.25	75
2:39	12/20/2007	20.9	16.7	12.7	49.7	-12.6	0.12	64	20	1.24	74
3:34	12/20/2007	20.8	16.6	13.3	49.3	-13.8	0.13	64	21	1.30	78
4:35	12/20/2007	20.6	16.4	12.9	50.1	-14.8	0.14	63	22	1.34	81
5:36	12/20/2007	20.4	16.2	12.9	50.5	-16.1	0.15	64	23	1.39	83
6:36	12/20/2007	19.7	15.7	12.7	51.9	-17.4	0.19	64	25	1.46	88
7:34	12/20/2007	19.9	16.1	13.4	50.6	-16.2	0.1	64	19	1.12	67
8:31	12/20/2007	19.5	15.8	13.5	51.2	-18.4	0.16	64	23	1.33	80
9:41	12/20/2007	17.9	14.4	13.5	54.2	-4.5	0.02	60	5	0.27	16
9:45	12/20/2007	20.8	16.4	12.7	50.1	-5.3	0.02	60	6	0.37	22
10:30	12/20/2007	23.6	18.5	11.8	46.1	-12.8	0.14	64	22	1.54	92
11:30	12/20/2007	19.7	15.8	13	51.5	-29.2	0.39	65	36	2.10	126
12:34	12/20/2007	18.7	15.3	13.2	52.8	-28.9	0.42	65	38	2.11	126
13:30	12/20/2007	18.4	15	13	53.6	-29	0.46	65	40	2.18	131
14:32	12/20/2007	18.1	14.9	12.9	54.1	-28.4	0.35	65	34	1.83	109
15:30	12/20/2007	17.7	14.7	12.9	54.7	-28.4	0.42	65	38	1.99	120
16:33	12/20/2007	17.1	14.3	13.2	55.4	-28.6	0.87	65	57	2.89	173
17:33	12/20/2007	17.7	14.6	13.2	54.5	-28.8	0.42	65	38	1.99	120
18:39	12/20/2007	17.4	14.4	13.4	54.8	-28.9	0.42	65	38	1.96	118
18:39	12/20/2007	17.4	14.4	13.4	54.8	-28.9	0.41	65	38	1.96	118
19:35	12/20/2007	17.5	14.6	13.4	54.5	-28.9	0.42	63	38	1.97	118
20:40	12/20/2007	17.7	14.7	13.2	54.4	-29.2	0.41	65	38	1.99	120
21:38	12/20/2007	17.4	14.4	13.9	54.3	-29.3	0.43	62	39	2.01	121
22:42	12/20/2007	17.1	14.1	13.3	55.5	-29.5	0.47	65	40	2.03	122
23:40	12/20/2007	17	14.2	13.1	55.7	-29.4	0.85	64	56	2.82	169
0:38	12/21/2007	17	14.1	13.2	55.7	-29.5	0.44	63	39	1.97	118
1:36	12/21/2007	16.7	13.9	13.1	56.3	-29.8	0.44	63	39	1.93	116
2:36	12/21/2007	16.8	13.9	13	56.3	-22.4	5.08	63	38	1.89	114
3:36	12/21/2007	16.9	14.1	13.1	55.9	-30.2	0.45	63	39	1.95	117
4:36	12/21/2007	17.1	14.2	13.1	55.6	-30.3	0.44	63	39	1.98	119
5:36	12/21/2007	17.2	14.4	13.6	54.8	-30.4	0.41	63	38	1.94	116
6:36	12/21/2007	16.8	14.1	13.3	55.8	-30.6	0.41	63	38	1.89	114
7:37	12/21/2007	17.4	14.5	13.1	55	-30.6	0.44	62	39	2.01	121
8:07	12/21/2007	0	0.2	20.9	78.9	-2	0.01	48	3	0.00	0
8:36	12/21/2007	0	0.3	20.8	78.9	-0.5	0	46	0	0.00	0
9:02	12/21/2007	0	0	20.4	79.6	0	0	46	0	0.00	0
9:38	12/21/2007	3.5	3.8	19	73.7	0	0	46	0	0.00	0
10:06	12/21/2007	8.8	7.1	17.6	66.5	0	0	45	0	0.00	0
10:37	12/21/2007	9.2	7.4	17.6	65.8	0.1	0	41	0	0.00	0
11:39	12/21/2007	20	13.5	13.3	53.2	0	0	41	0	0.00	0
12:34	12/21/2007	29.9	19.2	10.1	40.8	0.3	0.04	41	9	0.80	48
13:39	12/21/2007	40.9	24.8	7.1	27.2	0.4	0	41	0	0.00	0
Average Values for Period from 13:30 (12/20) to 7:37 (12/21)		17.3	14.4	13.2	55.1	-29.1	0.70	63.9	40.2	2.06	123.6

TABLE 3
Methane Extraction Well MDW-2
Methane Extraction Test
Former McDowell County Landfill
Shield Project #1070249

Time	Date	Methane	Carbon Dioxide	Oxygen	Gas Balance	Static Pressure (inches of Water)	Differential Pressure (inches of Water)	Temperature (^{0}F)	Gas Flow Rate (scfm)	Corrected Gas Flow Rate (scfm)	Energy (kW-Hour)	Power (kilowatts)
		(Percentage of gas in air)										
10:39	12/19/2007	25.7	18.4	12.5	43.4	-16.9	0.58	63	47	48	3.66	219
10:55	12/19/2007	20.3	15.1	13.6	51	-17.4	0.53	63	45	45	2.71	162
11:16	12/19/2007	15.1	12.6	13.8	58.5	-17.8	0.79	63	55	55	2.46	148
11:39	12/19/2007	13.4	11.8	14.2	60.6	-17.5	0.57	62	46	47	1.87	112
12:11	12/19/2007	11	10.3	15.2	63.5	-17.2	1.52	62	78	78	2.54	153
12:36	12/19/2007	9.9	9.5	15.3	65.3	-14.8	0.54	62	45	45	1.32	79
13:09	12/19/2007	9	8.8	15.5	66.7	-17.6	0.54	62	45	45	1.20	72
13:37	12/19/2007	8.4	8.4	15.8	67.4	-13.8	2.58	62	103	103	2.57	154
13:40	12/19/2007	8.3	8.3	15.6	67.8	-17.2	0.14	62	22	22	0.54	32
14:11	12/19/2007	7.8	8	15.7	68.5	-14.1	0.42	62	40	40	0.93	55
14:38	12/19/2007	7.5	7.7	16.2	68.6	-17.7	0.32	62	35	34	0.76	45
15:38	12/19/2007	7	7.5	16.4	69.1	-16.8	0.46	62	41	42	0.87	52
16:39	12/19/2007	6.3	7.1	16.2	70.4	-19.6	0.68	62	51	51	0.95	57
17:36	12/19/2007	6.2	7.1	16.6	70.1	-19.7	2.54	61	101	101	1.86	111
18:37	12/19/2007	6	7	16.9	70.1	-19.8	1.84	60	85	86	1.53	92
19:36	12/19/2007	5	5.9	17.3	71.8	-19.1	2.4	60	98	98	1.45	87
20:41	12/19/2007	5.7	6.8	16.8	70.7	-15.1	1.94	60	90	89	1.50	90
21:35	12/19/2007	5.7	6.7	16.7	70.9	-17.2	2.19	60	94	94	1.59	95
22:36	12/19/2007	4.9	6	17.6	71.5	-16.3	0.54	59	45	45	0.65	39
23:42	12/19/2007	5.2	6.4	16.6	71.8	-17.6	1.97	60	90	90	1.39	83
0:48	12/20/2007	3.8	5.1	17.8	73.3	-17.1	0.35	60	34	36	0.41	24
1:43	12/20/2007	4	5.5	17	73.5	-7.4	0.07	58	15	14	0.17	10
2:45	12/20/2007	4.6	5.7	17.4	72.3	-8.7	0.18	58	24	26	0.35	21
3:42	12/20/2007	5.2	6.4	16.4	72	-9.8	0.18	58	28	26	0.40	24
3:42	12/20/2007	5.2	6.4	16.4	72	-0.2	0.03	58	28	7	0.11	6
4:42	12/20/2007	5.1	6.1	16.6	72.2	-10.4	0.24	58	30	30	0.45	27
5:42	12/20/2007	5.2	6.1	16.5	72.2	-11	0.28	57	32	33	0.51	31
6:43	12/20/2007	4.9	5.8	16.4	72.9	-11.3	0.29	57	33	33	0.48	29
7:39	12/20/2007	5	5.9	16.9	72.2	-10	0.15	57	23	23	0.34	20
8:40	12/20/2007	5	5.8	17.3	71.9	-11.4	0.24	58	33	30	0.44	27
9:50	12/20/2007	3.3	4.7	17.6	74.4	-2.2	0	56	1	0	0.00	0
10:36	12/20/2007	6.8	7.2	16.5	69.5	-30.8	1.2	59	67	67	1.35	81
11:35	12/20/2007	4.8	5.6	17.2	72.4	-22.5	0.73	58	52	53	0.75	45
12:40	12/20/2007	4.5	5.4	17.3	72.8	-22.4	0.7	58	51	51	0.68	41
13:35	12/20/2007	4.2	5.2	17.4	73.2	-22.3	0.74	58	53	53	0.66	40
14:37	12/20/2007	4.2	5.1	17.6	73.1	-22	0.68	57	51	51	0.64	38
15:36	12/20/2007	4	5	17.4	73.6	-22	0.69	57	51	51	0.61	36
16:39	12/20/2007	4	4.9	17.2	73.9	-22	1.36	57	74	73	0.87	52
17:38	12/20/2007	3.8	4.8	17.5	73.9	-21.9	0.68	57	50	50	0.56	34
18:44	12/20/2007	3.7	4.7	17.5	74.1	-22.1	0.7	57	52	51	0.56	34
19:42	12/20/2007	3.8	4.7	17.2	74.3	-22.1	0.72	57	52	52	0.59	35
20:47	12/20/2007	3.8	4.8	17.3	74.1	-22.2	0.68	57	50	51	0.57	34
21:42	12/20/2007	3.7	4.5	17.9	73.9	-22.4	0.73	57	52	53	0.58	35
22:48	12/20/2007	3.6	4.3	17.7	74.4	-22.4	0.7	57	52	51	0.54	33
23:44	12/20/2007	3.6	4.5	17.8	74.1	-22.5	0.71	57	52	52	0.56	33
0:43	12/21/2007	3.4	4.3	17.4	74.9	-22.8	0.7	56	52	51	0.51	31
1:41	12/21/2007	3.5	4.3	17.6	74.6	-22.9	0.71	57	52	52	0.54	32
2:41	12/21/2007	3.4	4.2	17.7	74.7	-22.8	0.61	57	52	48	0.48	29
3:41	12/21/2007	3.4	4.2	17.9	74.5	-23.2	0.73	57	54	52	0.52	31
4:41	12/21/2007	3.6	4.3	18.1	74	-23.4	0.73	57	54	52	0.56	33
5:40	12/21/2007	3.6	4.3	17.8	74.3	-23.5	0.72	56	51	52	0.56	33
6:40	12/21/2007	3.6	4.3	18	74.1	-23.6	0.74	57	52	53	0.57	34
7:41	12/21/2007	3.7	4.4	18.4	73.5	-23.7	0.77	56	55	55	0.60	36
8:12	12/21/2007	0	0	21	79	-0.3	0	41	0	0	0.00	0
8:12	12/21/2007	0	0	21.1	78.9	-0.3	0	41	0	0	0.00	0
8:41	12/21/2007	0	0.1	20.9	79	-0.1	0	42	0	0	0.00	0
9:08	12/21/2007	0	0	20.5	79.5	0	0	42	0	0	0.00	0
9:41	12/21/2007	0	0.2	20.7	79.1	0	0	40	0	0	0.00	0
10:12	12/21/2007	0.5	0.8	20.6	78.1	0	0	40	0	0	0.00	0
10:42	12/21/2007	1.4	1.7	20	76.9	0	0	42	0	0	0.00	0
11:44	12/21/2007	12.3	9.4	15.7	62.6	0	0	40	0	1	0.04	2
12:38	12/21/2007	22	16.1	12.8	49.1	0	0	41	0	0	0.00	0
13:44	12/21/2007	20.5	14.5	13.1	51.9	0	0	41	0	0	0.00	0
Average Values for Period from 13:35 (12/20) to 7:41 (12/21)		3.7	4.6	17.7	74.1	-22.6	0.7	56.9	53.2	52.8	0.58	35

TABLE 4
Methane Extraction Well MDW-3
Methane Extraction Test
Former McDowell County Landfill
Shield Project #1070249

Time	Date	Methane	Carbon Dioxide	Oxygen	Gas Balance	Static Pressure (inches of Water)	Differential Pressure (inches of Water)	Temperature (^{0}F)	Corrected Gas Flow Rate (scfm)	Energy (kW-Hour)	Power (kilowatts)
		(Percentage of gas in air)									
10:43	12/19/2007	4.6	3.4	19.5	72.5	-7.7	0.76	60	56	0.76	46
11:00	12/19/2007	4.1	2.8	20.1	73	-7.4	0.6	61	49	0.60	36
11:21	12/19/2007	3.7	2.5	19	74.8	-8.1	0.75	60	56	0.61	37
11:44	12/19/2007	3.6	2.4	19.8	74.2	-8	0.73	61	55	0.59	35
12:17	12/19/2007	3.4	2.3	19.8	74.5	-7.2	0.4	60	40	0.40	24
12:42	12/19/2007	3.2	2.3	19.8	74.7	-7.7	0.61	60	50	0.47	28
13:14	12/19/2007	3	2.2	19.8	75	-7.2	0.74	60	55	0.49	29
13:44	12/19/2007	2.9	2.1	19.7	75.3	-7.2	0.67	60	52	0.45	27
14:18	12/19/2007	2.8	2.1	19.9	75.2	-6.6	0.7	60	54	0.45	27
14:46	12/19/2007	2.7	2.1	20.1	75.1	-8.4	0.76	60	56	0.45	27
15:45	12/19/2007	2.8	2.4	19.7	75.1	-9.1	0.71	60	54	0.45	27
16:47	12/19/2007	2.6	2.3	19.6	75.5	-9.6	0.85	60	59	0.45	27
17:43	12/19/2007	2.5	2.4	19.8	75.3	-9.7	0.87	60	60	0.44	27
18:41	12/19/2007	2.4	2.4	19.6	75.6	-9.2	1.67	59	85	0.61	36
19:48	12/19/2007	2.3	2.4	19.7	75.6	-8.6	1.3	59	74	0.50	30
21:42	12/19/2007	2.2	2.5	19.5	75.8	-7.9	0.98	58	64	0.42	25
22:50	12/19/2007	2.3	2.6	19.7	75.4	-7.9	0.94	58	63	0.43	26
23:47	12/19/2007	2.3	2.6	19.3	75.8	-8.5	0.76	57	56	0.38	23
0:53	12/20/2007	2.1	2.6	19.6	75.7	-9.3	1.54	56	81	0.50	30
1:50	12/20/2007	2.1	2.6	19.5	75.8	-10.2	0.83	56	59	0.37	22
2:52	12/20/2007	1.9	2.4	19.5	76.2	-8.6	0.49	57	44	0.25	15
3:49	12/20/2007	2	2.5	19.5	76	-8.6	0.63	57	50	0.30	18
4:48	12/20/2007	2	2.5	19.4	76.1	-8.2	0.62	56	50	0.30	18
5:48	12/20/2007	2	2.4	19.5	76.1	-7.9	0.58	56	49	0.29	17
6:51	12/20/2007	1.9	2.3	19.4	76.4	-7.6	0.58	56	49	0.28	17
7:45	12/20/2007	2	2.4	20	75.6	-7	0.44	56	43	0.26	15
8:46	12/20/2007	2	2.4	19.9	75.7	-7.7	0.57	56	48	0.28	17
9:55	12/20/2007	3.7	2.9	19.6	73.8	-0.2	-0.01	48	0	0.00	0
11:40	12/20/2007	2.2	2.5	19.6	75.7	-11.6	0.95	56	63	0.41	25
12:45	12/20/2007	1.9	2.3	19.6	76.2	-11.5	0.97	56	63	0.36	21
13:40	12/20/2007	1.8	2.2	19.5	76.5	-11.3	0.96	56	63	0.34	20
14:41	12/20/2007	1.6	2	19.7	76.7	-11	0.98	55	64	0.30	18
15:40	12/20/2007	1.6	2	19.7	76.7	-10.9	0.95	55	63	0.30	18
16:45	12/20/2007	1.5	1.9	19.6	77	-10.4	1.91	55	92	0.41	25
17:42	12/20/2007	1.4	1.9	19.7	77	-10.6	0.97	55	64	0.27	16
18:50	12/20/2007	1.3	1.9	19.7	77.1	-10.4	0.95	55	63	0.24	15
19:47	12/20/2007	1.3	1.9	19.7	77.1	-10.5	0.94	53	63	0.24	15
20:53	12/20/2007	1.5	2	19.5	77	-11	0.99	53	65	0.29	17
21:47	12/20/2007	1.5	1.9	19.9	76.7	-11	0.92	53	63	0.28	17
22:55	12/20/2007	1.4	1.8	19.8	77	-11	0.95	53	64	0.27	16
23:50	12/20/2007	1.4	1.9	19.7	77	-11.2	0.96	53	64	0.27	16
0:47	12/21/2007	1.4	1.8	19.6	77.2	-11.3	0.96	52	64	0.27	16
1:46	12/21/2007	1.4	1.8	19.7	77.1	-11.6	0.96	52	64	0.27	16
2:46	12/21/2007	1.3	1.8	19.8	77.1	-10.7	-0.12	51	64	0.25	15
3:46	12/21/2007	1.4	1.8	19.8	77	-12.1	0.99	51	65	0.27	16
4:46	12/21/2007	1.5	1.9	19.7	76.9	-12.2	0.97	52	64	0.28	17
5:46	12/21/2007	1.5	1.9	19.9	76.7	-12.4	0.96	52	64	0.28	17
6:47	12/21/2007	1.6	1.9	19.7	76.8	0	-0.06	52	62	0.29	18
7:47	12/21/2007	1.7	2	19.9	76.4	-13	0.98	51	64	0.32	19
8:21	12/21/2007	1.7	2	19.8	76.5	0	0	43	0	0.00	0
8:46	12/21/2007	1.6	1.9	19.8	76.7	0	0	42	0	0.00	0
9:17	12/21/2007	1.7	2	19.6	76.7	0	0	42	0	0.00	0
9:48	12/21/2007	1.3	1.6	20.1	77	0	0.02	42	4	0.02	1
10:17	12/21/2007	6.5	5	19.1	69.4	0	0	40	0	0.00	0
10:46	12/21/2007	17.5	11.3	15.1	56.1	0	0	40	0	0.00	0
11:50	12/21/2007	19	12.1	14.6	54.3	0	0	40	0	0.00	0
12:43	12/21/2007	22.4	13.9	13.1	50.6	0	0	42	0	0.00	0
13:49	12/21/2007	25	15.4	13.1	46.5	0	0	44	0	0.00	0
Average Values for Period from 13:40 (12/20) to 7:47 (12/21)		1.48	1.91	19.72	76.89	-10.66	0.90	53.11	65.21	0.29	17



0 100' 200'

APPROXIMATE SCALE: 1 in. = 200 ft.

LEGEND

✳ PROPOSED BORING LOCATION

SHIELD ENGINEERING, INC.
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
704-394-6913
704-394-6968 fax
www.shieldengineering.com

PROPOSED METHANE INVESTIGATION PROBE LAYOUT

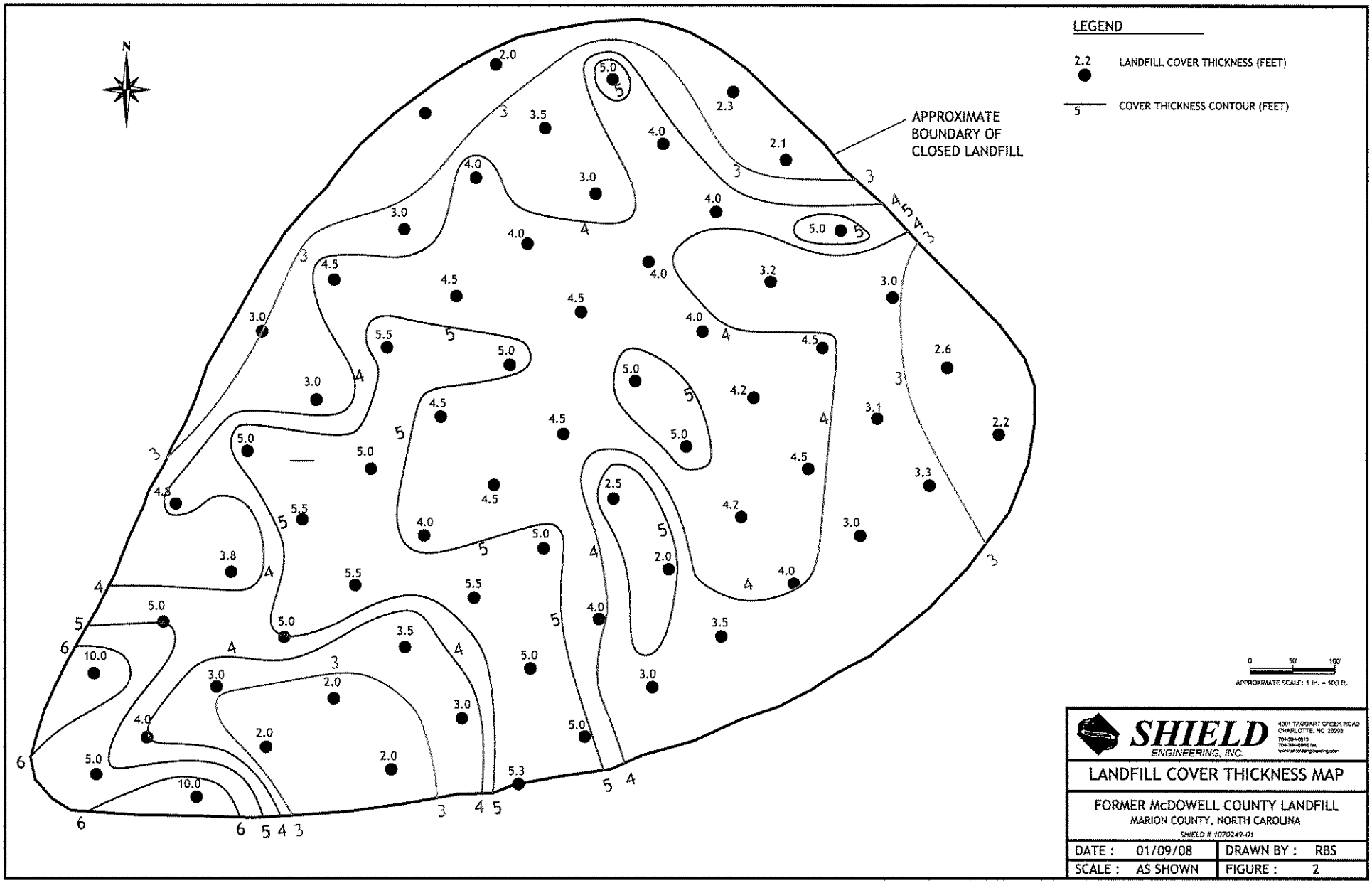
FORMER McDOWELL COUNTY LANDFILL

MARION COUNTY, NORTH CAROLINA

SHIELD # 1070249-01

DATE :	10/29/07	DRAWN BY :	RBS
SCALE :	AS SHOWN	FIGURE :	1

H:\PROJECTS\2007\1070249-01 ASU METHANE INVESTIGATION\FIGURES\FIGURE 1



H:\PROJECTS\2007\1070249-01 ASU METHANE INVESTIGATION\FIGURES\LANDFILL COVER THICKNESS MAP.DWG

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CHARLOTTE, NC 28208
704-394-8610
704-394-8696 fax
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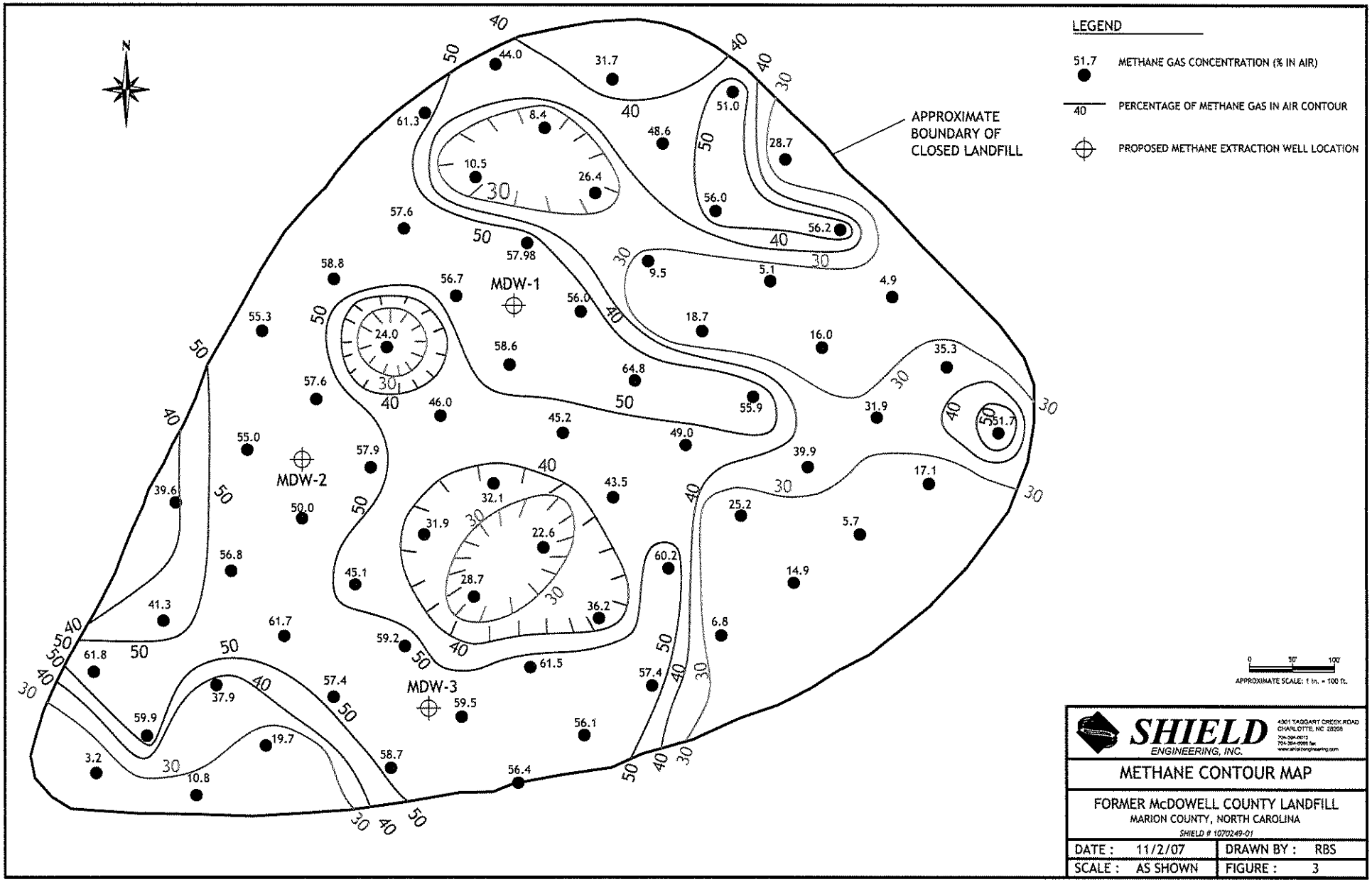
LANDFILL COVER THICKNESS MAP

FORMER McDOWELL COUNTY LANDFILL
MARION COUNTY, NORTH CAROLINA
SHIELD # 1070249-01

DATE : 01/09/08	DRAWN BY : RBS
SCALE : AS SHOWN	FIGURE : 2



H:\PROJECTS\2007\1070249-01 ASU METHANE INVESTIGATION\FIGURES\METHANE CONTOUR MAP

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CHARLOTTE, NC 28208
704-394-0012
704-394-9088 fax
www.shieldengineering.com

METHANE CONTOUR MAP

FORMER McDOWELL COUNTY LANDFILL
MARION COUNTY, NORTH CAROLINA
SHIELD # 1070249-01

DATE :	11/2/07	DRAWN BY :	RBS
SCALE :	AS SHOWN	FIGURE :	3

FIGURES 4
GAS FLOW RATE vs. TIME
METHANE EXTRACTION WELLS MDW-1, MDW-2, and MDW-3
McDOWELL COUNTY LANDFILL

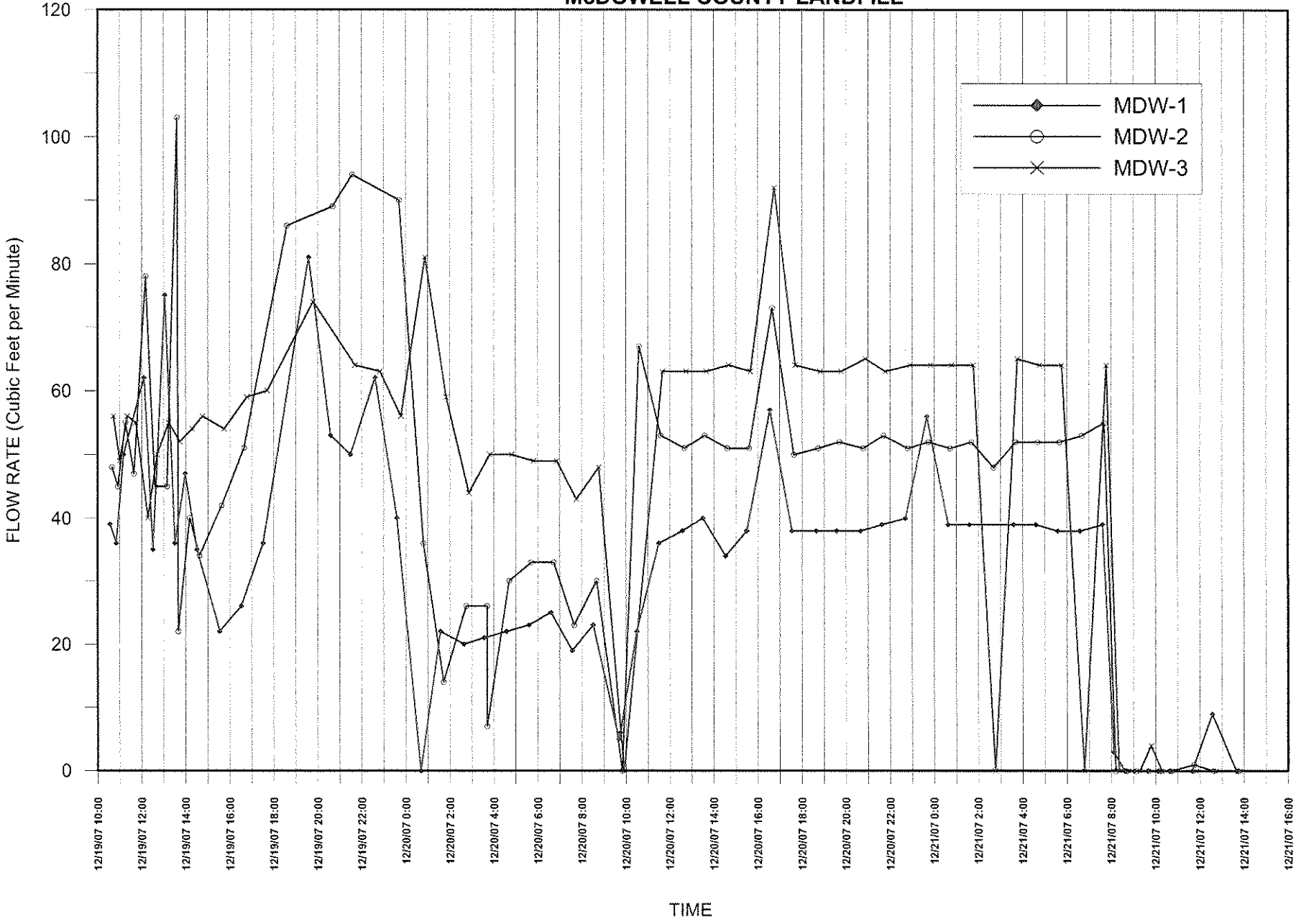


FIGURE 5
GAS MIX % vs. TIME
METHANE EXTRACTION WELL MDW-1
McDOWELL COUNTY LANDFILL

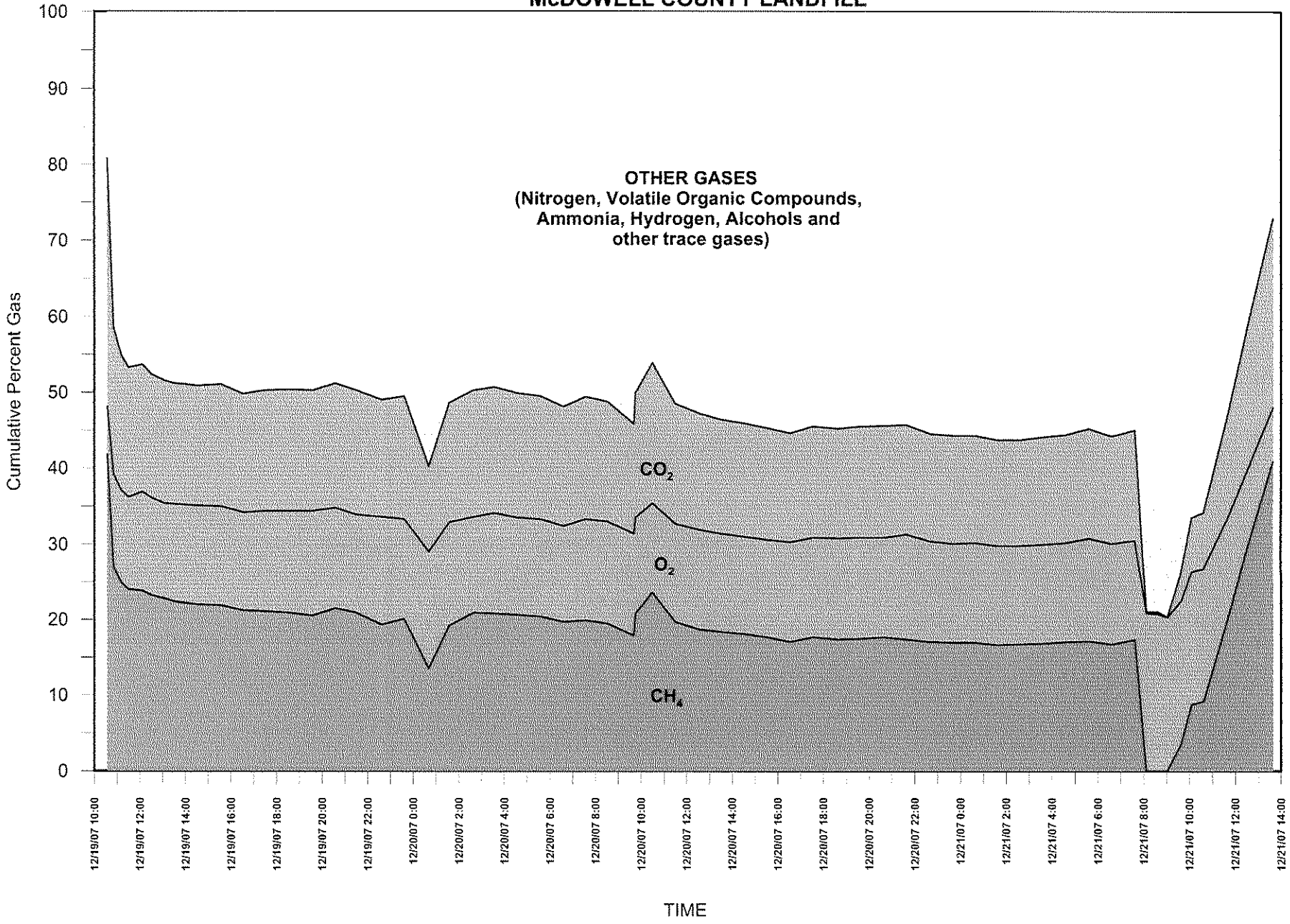


FIGURE 6
GAS MIX % vs. TIME
METHANE EXTRACTION WELL MDW-2
McDOWELL COUNTY LANDFILL

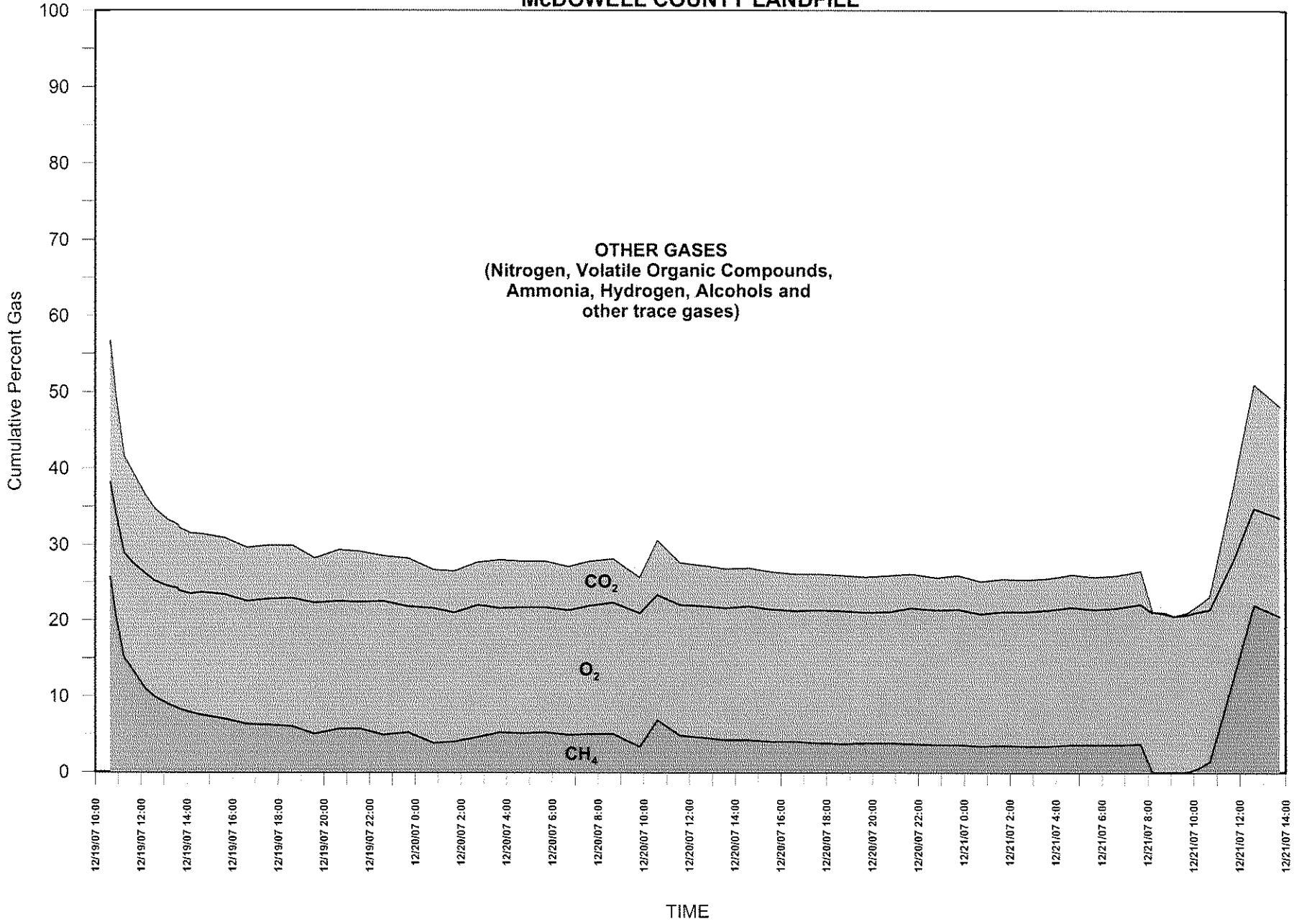


FIGURE 7
GAS MIX % vs. TIME
METHANE EXTRACTION WELL MDW-3
McDOWELL COUNTY LANDFILL

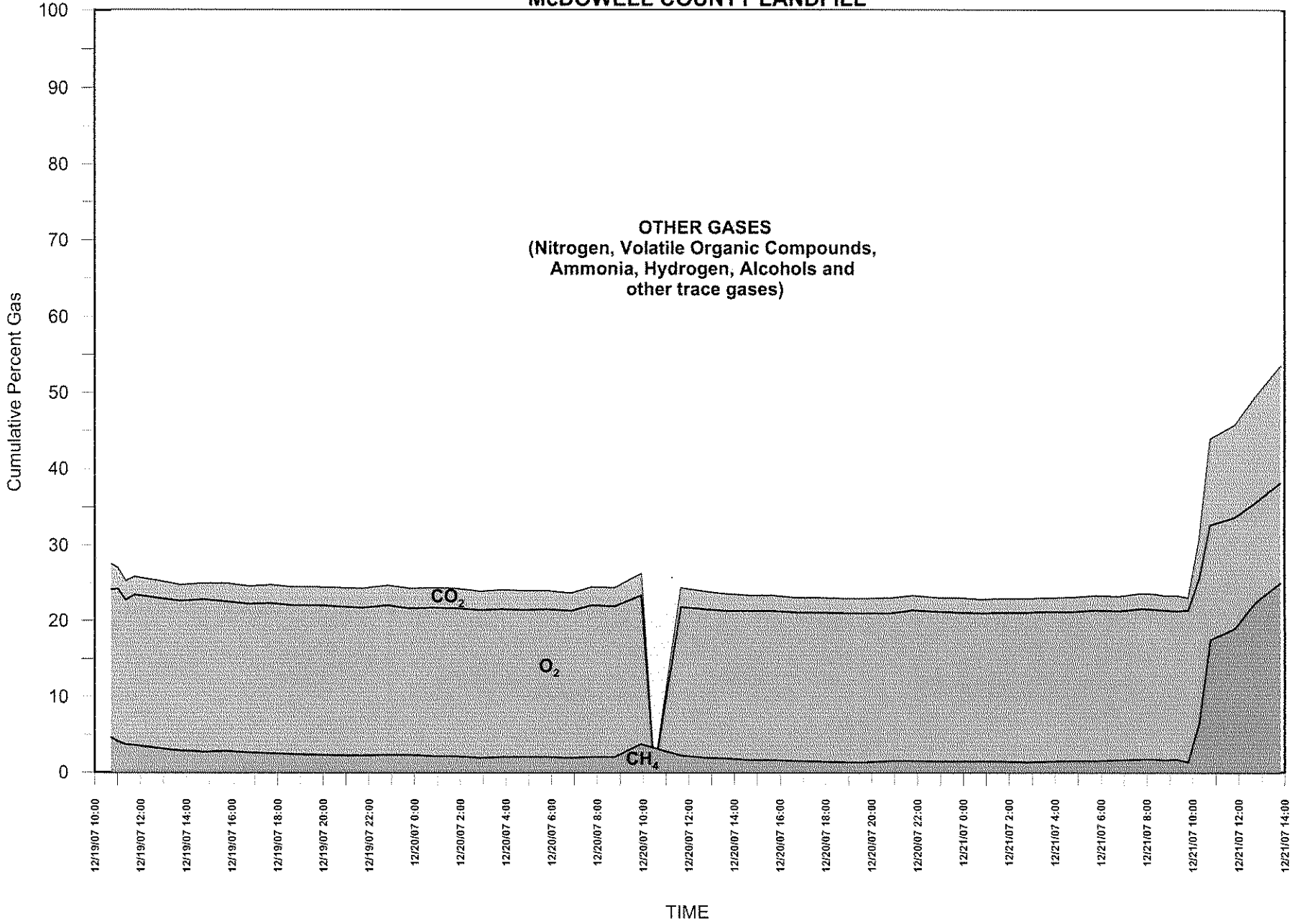


FIGURE 8
GAS % vs. TIME
METHANE EXTRACTION WELL MDW-1
McDOWELL COUNTY LANDFILL

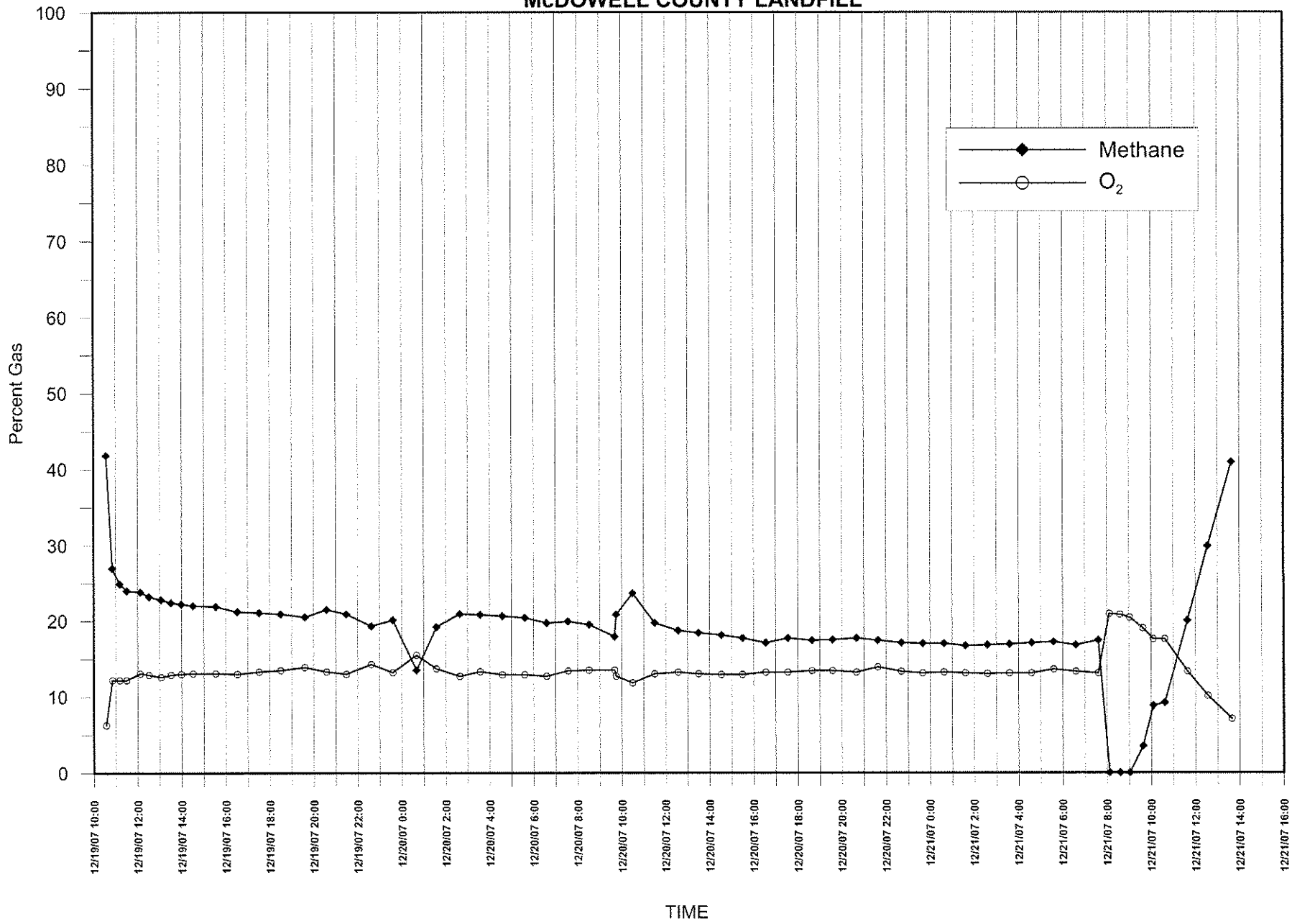


FIGURE 9
GAS % vs. TIME
METHANE EXTRACTION WELL MDW-2
McDOWELL COUNTY LANDFILL

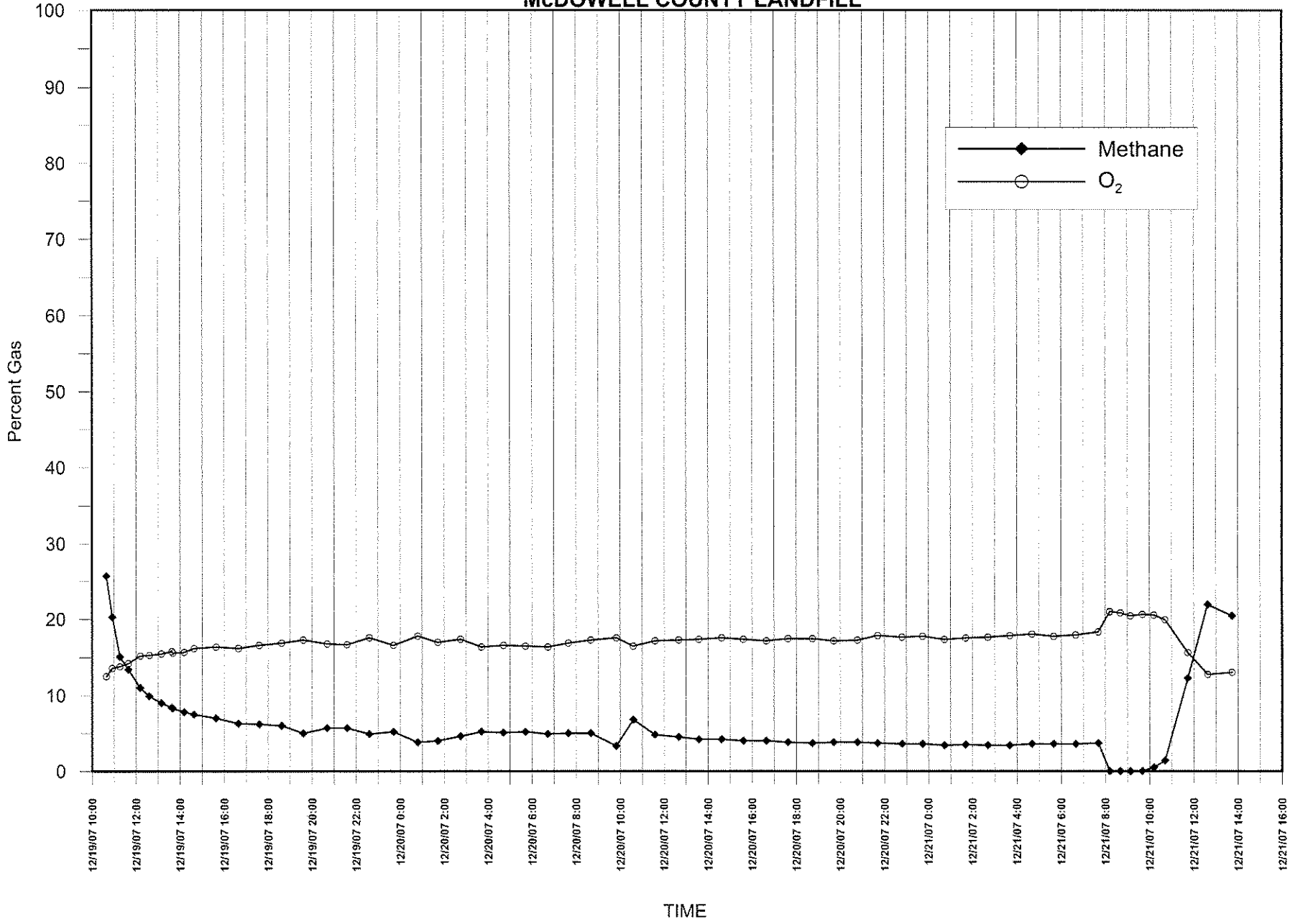


FIGURE 10
GAS % vs. TIME
METHANE EXTRACTION WELL MDW-3
McDOWELL COUNTY LANDFILL

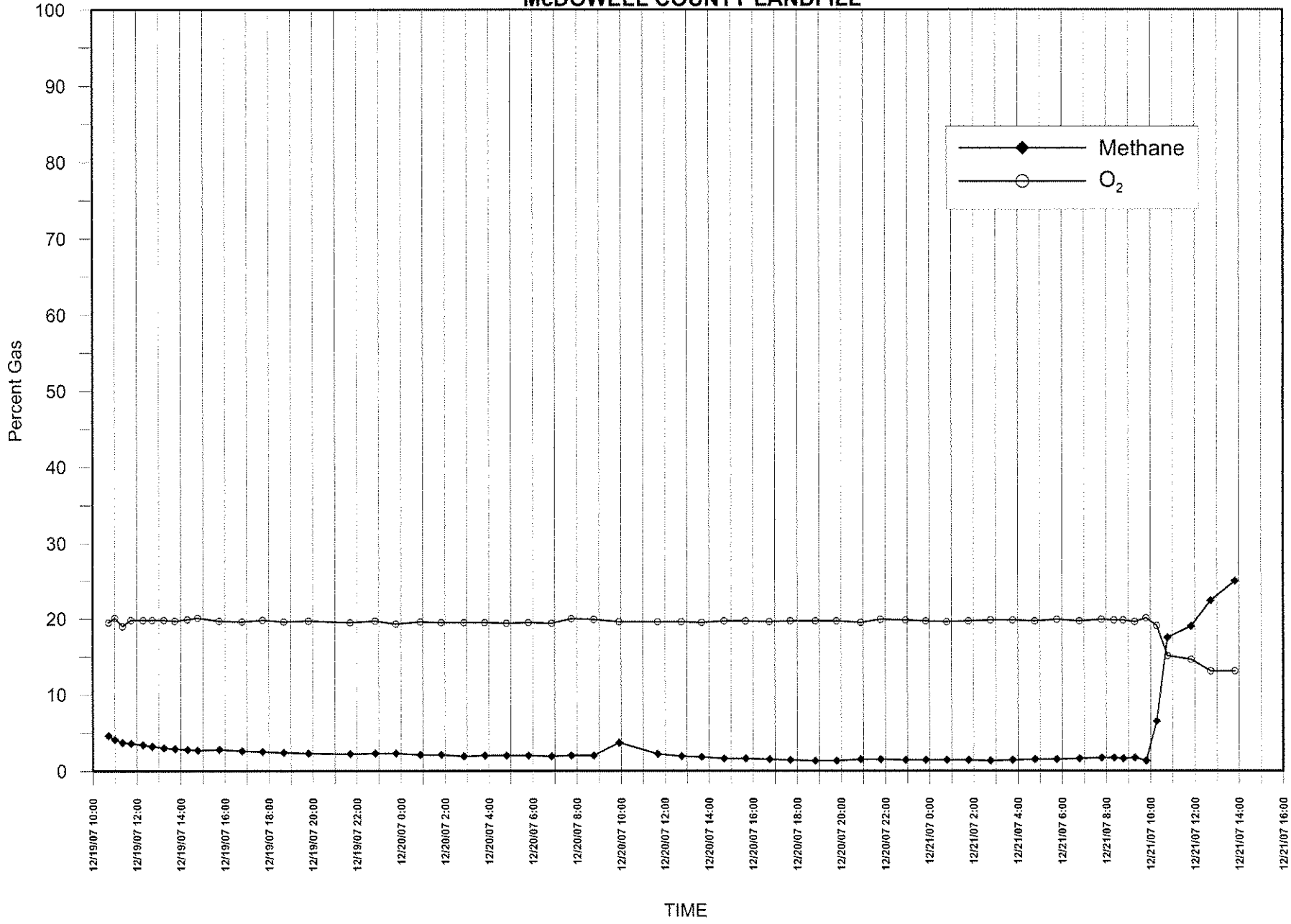


FIGURE 11
KILOWATTS vs. TIME
METHANE EXTRACTION WELL MDW-1
McDOWELL COUNTY LANDFILL

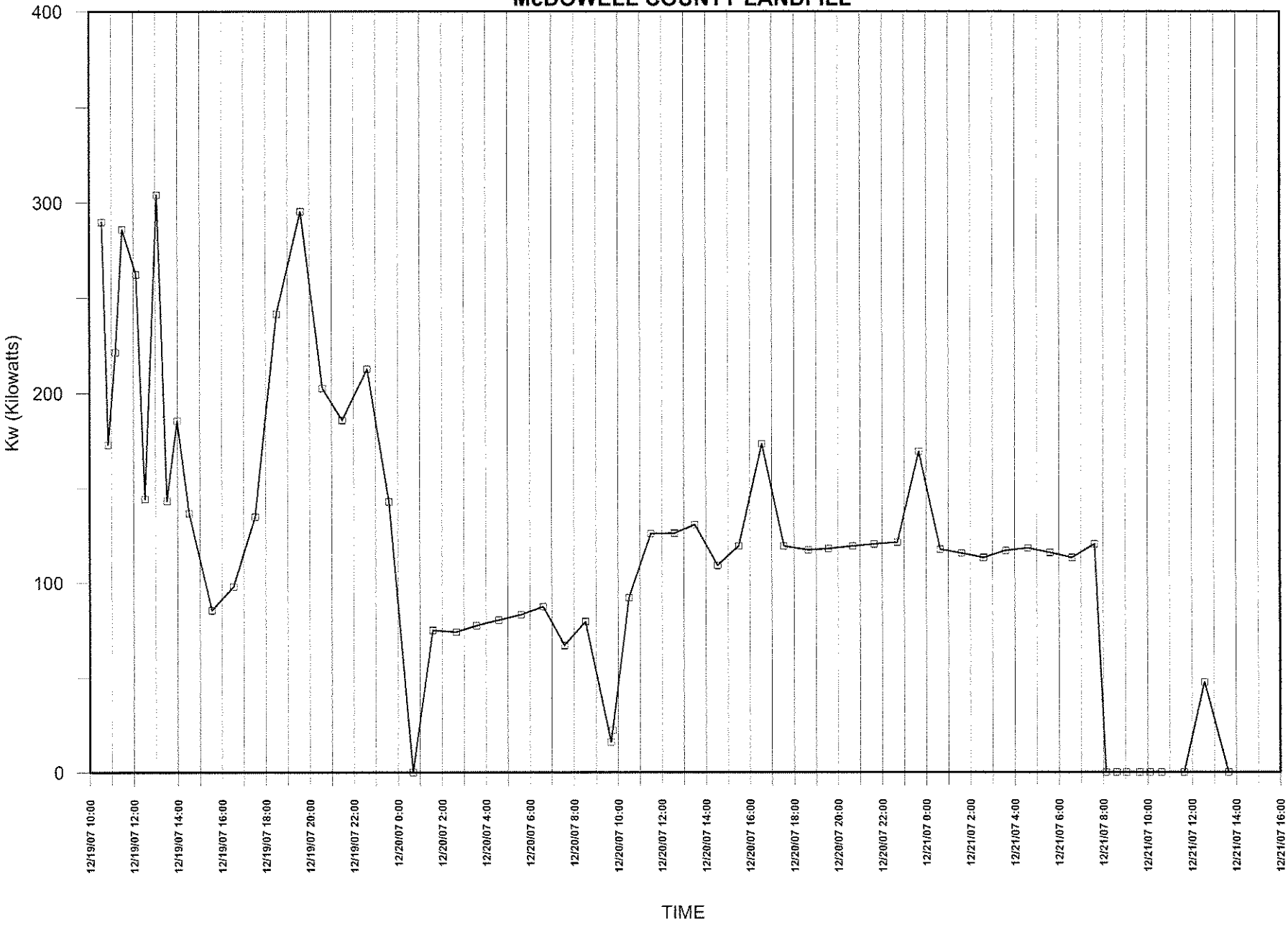


FIGURE 12
KILOWATTS vs. TIME
METHANE EXTRACTION WELL MDW-2
McDOWELL COUNTY LANDFILL

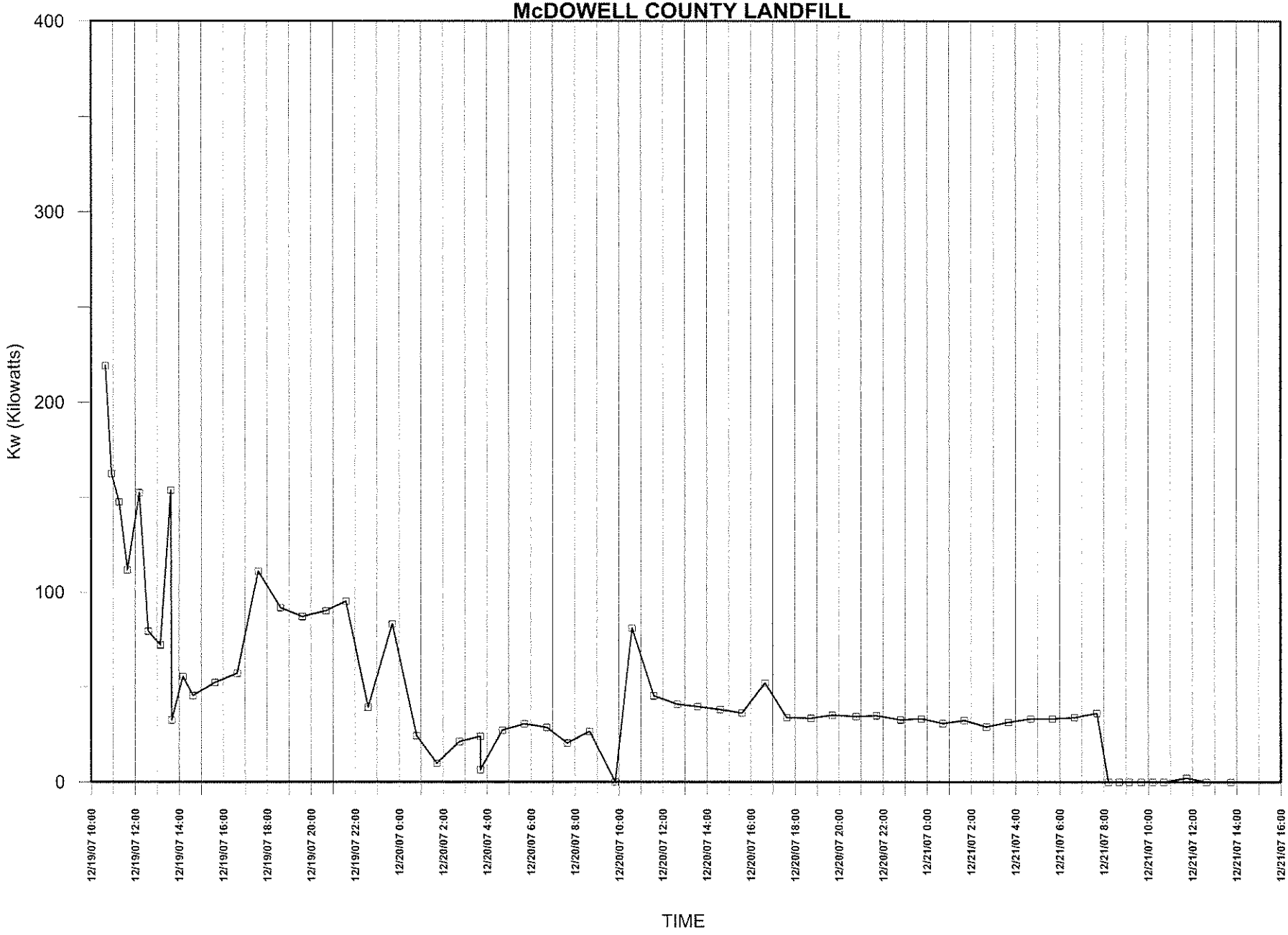
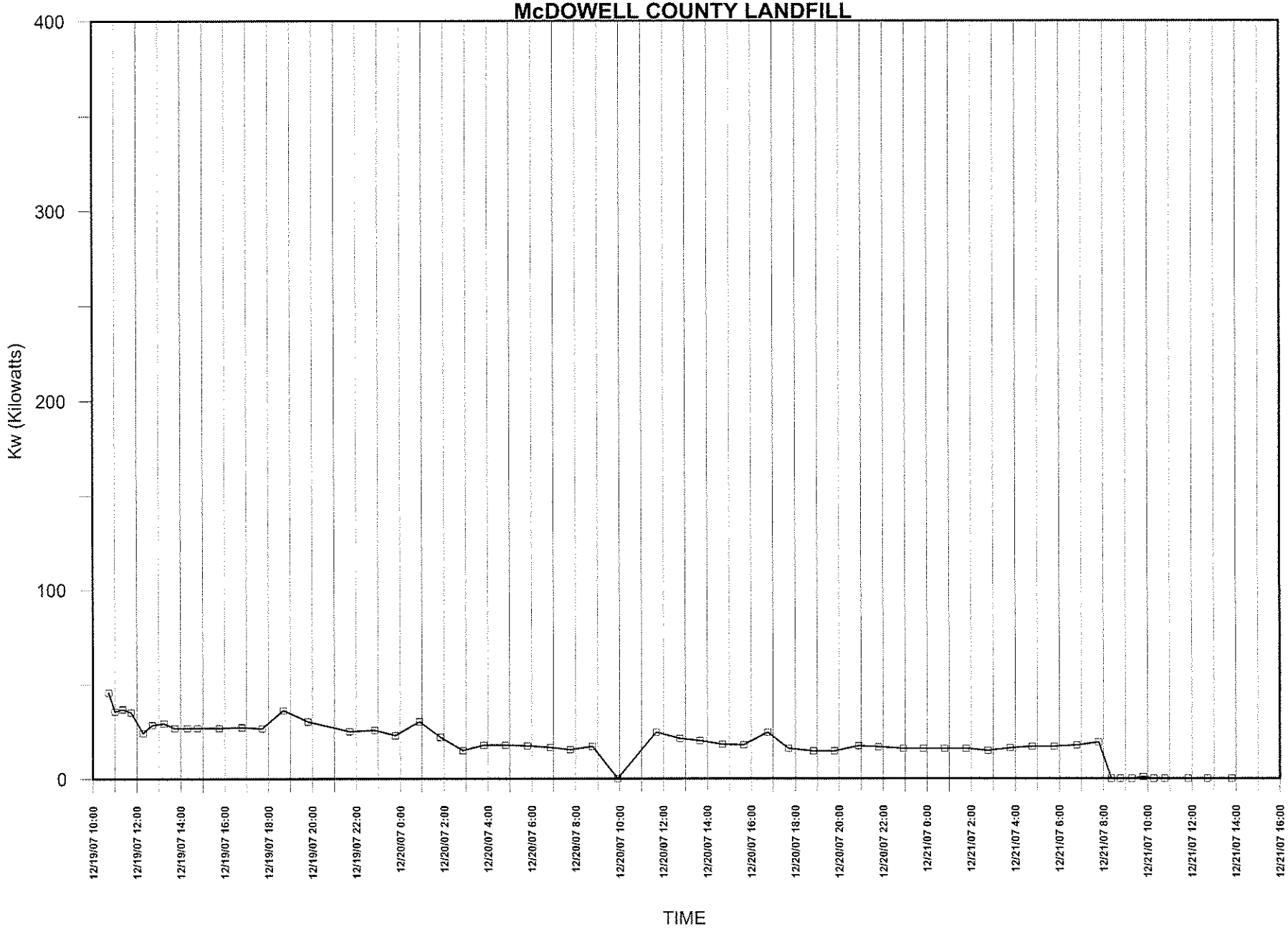
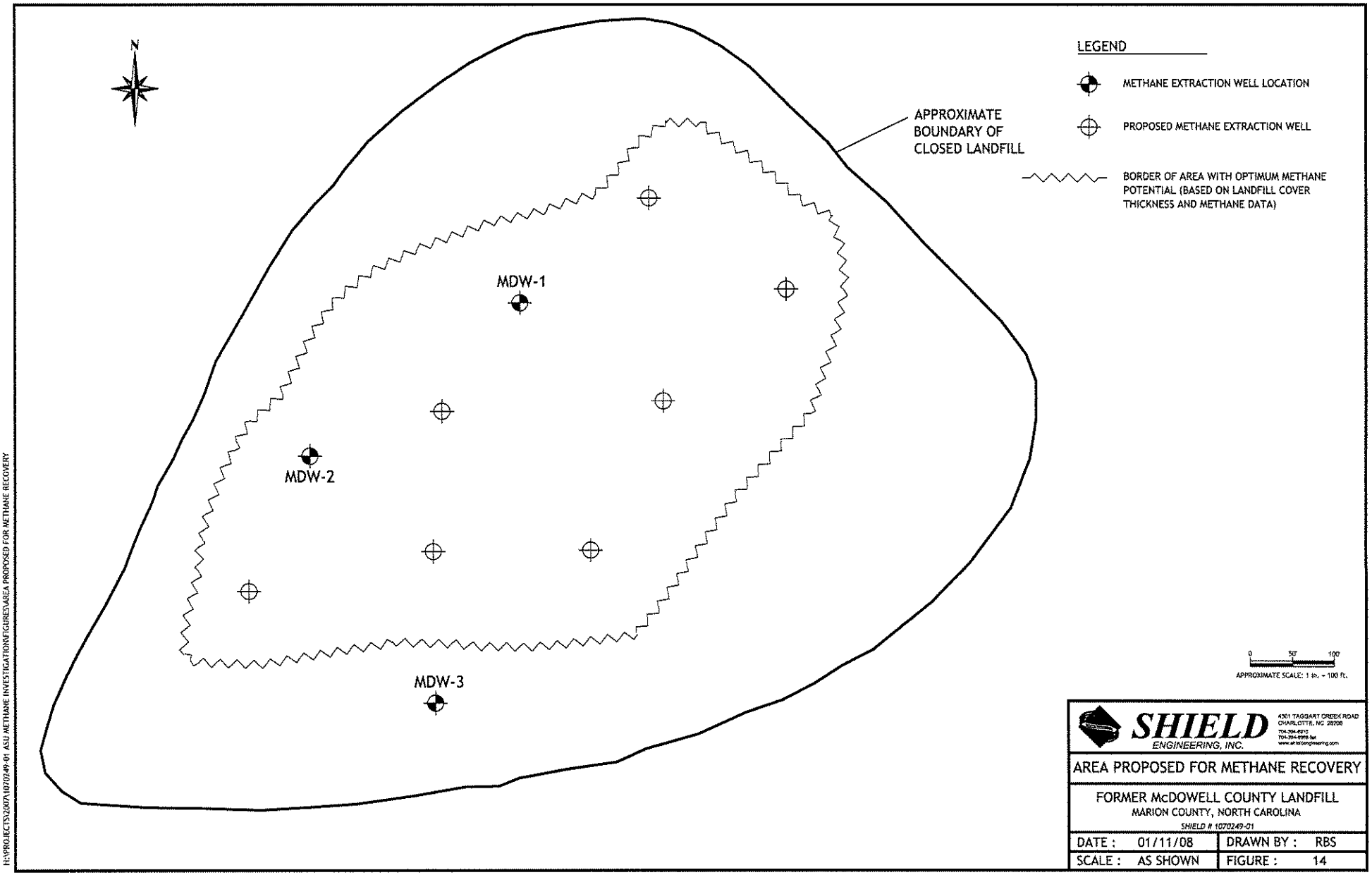


FIGURE 13
KILOWATTS vs. TIME
METHANE EXTRACTION WELL MDW-3
McDOWELL COUNTY LANDFILL





SHIELD ENGINEERING, INC.
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
704-994-4013
704-394-0998 fax
www.shieldengineering.com

AREA PROPOSED FOR METHANE RECOVERY

FORMER McDOWELL COUNTY LANDFILL
MARION COUNTY, NORTH CAROLINA
SHIELD # 1070249-01

DATE :	01/11/08	DRAWN BY :	RBS
SCALE :	AS SHOWN	FIGURE :	14

H:\PROJECTS\2007\1070249-01 ASU METHANE INVESTIGATION\FIGURES\AREA PROPOSED FOR METHANE RECOVERY

Research Triangle Park Laboratories, Inc.
8109 Ebenezer Church Road
Raleigh, NC 27612

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NELAC Accredited NJ# NC003

January 7, 2008

Shield Engineering
4301 Taggart Creek Road
Charlotte, NC 28208

Attn: David Wallace

PROJECT: Former McDowell County Landfill; PO 1070249
RTP Labs # 07-265

Enclosed with this letter is the report on the chemical analyses for the samples received December 21, 2007 for a normal turnaround. One Tedlar bag and one XD-2 sorbent tube samples were received in good condition. The Tedlar bag sample was analyzed for VOCs by EPA Method TO-15 GC/MS for 60 VOC Target Compounds. In addition, a library search was performed for the top 30 organic compounds (Tentatively Identified Compounds) using EPA/NIST 149,000 mass spectral database. The Tedlar bag samples were also analyzed for sulfur compounds by EPA Modified Method 15/16 GC/FPD and for Fixed Gases by EPA Method 3C GC/TCD. The XAD-2 sorbent tubes were analyzed for Siloxanes by GC/MS using an in-house RTP Labs method.

Please note that ND means not detected at the reporting limits expressed.

Sincerely,

Alston Sykes

Alston Sykes, Principal Chemist

Attachments: Sulfur & Fixed Gases report, Siloxanes report; TO-15 report, COC form.

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Laboratory Report

Client: Shield Engineering
Contact: David Wallace
Client Proj. #: Former McDowell Cty Landfill
Sample Date: 12/20/2007
Matrix: XAD-2 Sorbent
RTP Labs Proj. #:07-265
Date Received: 12/21/2007 **Analysis Date:** 1/4/2008

EPA Method 15/16 for Sulfurs by GC/FPD

Sample ID	H_2S Hydrogen Sulfide	COS Carbonyl Sulfide	CH_4S Methyl Mercaptan	$(CH_3)_2S$ Dimethyl Sulfide	$C_2H_6S_2$ Dimethyl Disulfide	CS_2 Carbon Disulfide	Detection Limit
MDLF #1	2.4	ND	ND	ND	ND	ND	0.5 ppmv

EPA Method 3C for Fixed Gases by GC/TCD

Sample ID	H_2 Hydrogen	CO_2 Carbon Dioxide	O_2 Oxygen	N_2 Nitrogen	CH_4 Methane	CO Carbon Monoxide	Detection Limit
MDLF #1	18.8	3.9	11.2	36.1	31.7	1	1 %

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Laboratory Report

Client: Shield Engineering
Contact: David Wallace
Client Proj. #: Former McDowell Cty Landfill
Sample Date: 12/20/2007
Matrix: XAD-2 Sorbent
RTP Labs Proj. #:07-265
Date Received: 12/21/2007 **Analysis Date:** 1/4/2008

Siloxanes Analysis by GC/MS

Sample Description	MDLF #1	Reporting Limits
Compound		Units, µg ppbv 20L
Hexamethyldisiloxane (L2)	ND	1.0µg 8 ppbv
Hexamethylcyclotrisiloxane (D3)	ND	1.0µg 6 ppbv
Octamethyltrisiloxane (L3)	ND	1.0µg 5 ppbv
Octamethylcyclotetrasiloxane (D4)	3.7 µg 14.8 ppbv	1.0µg 4 ppbv
Decamethyltetrasiloxane (L4)	ND	1.0µg 4 ppbv
Decamethylcyclopentasiloxane (D5)	ND	1.0µg 3 ppbv
Dodecamethylpentasiloxane, (L5)	ND	1.0µg 3 ppbv
Dodecamethylcyclohexasiloxane (D6)	ND	1.0µg 3 ppbv

ND = Non-detect at Reporting Limit, Units are Total micrograms found on the sample tube. Parts per billion by volume (ppbv) is based on a assumed 20 liter air samples.

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EPA Method TO-15 GC/MS VOLATILE ORGANICS ANALYSIS REPORT

Data File: c:\varianws\wsdatafiles\voc022707\07-265-01b.sms **Acquisition Date:** 12/24/2007 12:03
Comment: Shield Eng/Former McDowell Cty LF #1 12/20/07; 10mL DF=50

CAS NO.	COMPOUND	CONCENTRATION	UNITS	Method Detection Limit
75-71-8	Dichlorodifluoromethane (Freon 12)	43.74	ppbv	0.5
76-14-2	1,2-Chloro-1,1,2,2-Tetrafluoroethane	Not Found	ppbv	0.5
74-87-3	Chloromethane	20.55	ppbv	0.5
75-01-4	Vinyl chloride	Not Found	ppbv	0.5
106-99-0	1,3-Butadiene	Not Found	ppbv	0.5
74-83-9	Bromomethane	Not Found	ppbv	0.5
75-00-3	Chloroethane	Not Found	ppbv	0.5
75-69-4	Trichloromonofluoromethane	Not Found	ppbv	0.5
75-35-4	1,1-dichloroethene	Not Found	ppbv	0.5
76-13-1	1,1,2-trichloro-1,2,2-trifluoroethane	Not Found	ppbv	0.5
64-17-5	Ethanol	22.37	ppbv	0.5
75-15-0	Carbon disulfide	Not Found	ppbv	0.5
67-63-0	Isopropyl alcohol	9.89	ppbv	0.5
75-09-2	Methylene chloride	Not Found	ppbv	0.5
67-64-1	Acetone	210.10	ppbv	0.5
156-60-5	t-1,2-dichloroethene	Not Found	ppbv	0.5
11-05-3	Hexane	80.94	ppbv	0.5
1634-04-4	Methyl-t-butyl ether (MTBE)	1.46	ppbv	0.5
75-34-3	1,1-Dichloroethane	Not Found	ppbv	0.5
108-05-4	Vinyl acetate	Not Found	ppbv	0.5
156-59-2	cis-1,2-dichloroethene	Not Found	ppbv	0.5
110-82-7	Cyclohexane	17.81	ppbv	0.5
67-66-3	Chloroform	Not Found	ppbv	0.5
141-78-6	Ethyl Acetate	Not Found	ppbv	0.5
109-99-9	Tetrahydrofuran	75.31	ppbv	0.5
71-55-6	1,1,1-trichloroethane	Not Found	ppbv	0.5
56-23-5	Carbon Tetrachloride	Not Found	ppbv	0.5
78-93-3	2-Butanone	Not Found	ppbv	0.5
142-82-5	Heptane	21.67	ppbv	0.5
71-43-2	Benzene	63.90	ppbv	0.5
107-06-2	1,2-dichloroethane	Not Found	ppbv	0.5
79-01-6	Trichloroethylene	Not Found	ppbv	0.5
78-87-5	1,2-dichloropropane	Not Found	ppbv	0.5
75-27-4	Bromodichloromethane	Not Found	ppbv	0.5
123-91-1	1,4-dioxane	Not Found	ppbv	0.5
10061-01-5	cis-1,3-dichloropropene	Not Found	ppbv	0.5
108-88-3	Toluene	22.36	ppbv	0.5
108-10-1	4-Methyl-2-pentanone (MIBK)	21.78	ppbv	0.5
1006-02-6	t-1,3-dichloropropene	Not Found	ppbv	0.5
127-18-4	Tetrachloroethylene	Not Found	ppbv	0.5
79-00-5	1,1,2-trichloroethane	Not Found	ppbv	0.5
124-48-1	Dibromochloromethane	Not Found	ppbv	0.5
106-93-4	1,2-dibromoethane	Not Found	ppbv	0.5
591-78-6	2-Hexanone	140.31	ppbv	0.5
100-41-4	Ethylbenzene	189.57	ppbv	0.5
108-90-7	Chlorobenzene	38.88	ppbv	0.5
1330-20-7	m/p-Xylene	246.93	ppbv	0.5
95-47-6	o-Xylene	49.92	ppbv	0.5
100-42-5	Styrene	Not Found	ppbv	0.5
75-25-2	Tribromomethane	Not Found	ppbv	0.5
79-34-5	1,1,2,2-tetrachloroethane	Not Found	ppbv	0.5
622-96-8	1-ethyl-4-methylbenzene	55.10	ppbv	0.5
108-67-8	1,3,5-trimethylbenzene	137.57	ppbv	0.5
95-63-6	1,2,4-trimethylbenzene	58.73	ppbv	0.5
541-73-1	1,3-dichlorobenzene	Not Found	ppbv	0.5
106-46-7	1,4-dichlorobenzene	Not Found	ppbv	0.5
100-44-7	Benzyl chloride	Not Found	ppbv	0.5
95-50-1	1,2-dichlorobenzene	Not Found	ppbv	0.5
87-68-3	1,1,2,3,4,4-hexachloro-1,3-butadiene	Not Found	ppbv	0.5
120-82-1	1,2,4-trichlorobenzene	Not Found	ppbv	0.5

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TENTATIVELY IDENTIFIED COMPOUNDS

EPA Method TO-15 GC/MS VOLATILE ORGANICS ANALYSIS REPORT

Data File: c:\varianws\wsdatafiles\voc022707\07-265-01b.sms **Acquisition Date:** 12/24/2007 12:03
Comment: Shield Eng/Former McDowell Cty LF #1 12/20/07; 10mL DF=50

CAS NO.	COMPOUND NAME	Retention Time	Estimated Concentration,	
79-46-9	Propane, 2-nitro-	8.78	**116.91**	ppbv
1768-25-8	Cyanic acid, 2-methylpropyl ester	17.1	**199.84**	ppbv
37533-06-5	N-(2,6-Dichlorophenyl)-N-[(2E)-3-methyl-	17.4	**538.42**	ppbv
625-74-1	Propane, 2-methyl-1-nitro-	18.5	**285.98**	ppbv
6236-88-0	Cyclohexane, 1-ethyl-4-methyl-, trans-	19.0	**258.95**	ppbv
625-74-1	Propane, 2-methyl-1-nitro-	19.6	**302.79**	ppbv
75991-61-6	2,7-Octadiene-1,6-diol, 2,6-dimethyl-, (	19.7	**140.11**	ppbv
4558-27-4	5-Bromo-1-hexene	19.8	**579.05**	ppbv
51677-41-9	Butane, 2-azido-2,3,3-trimethyl-	20.0	**681.04**	ppbv
625-74-1	Propane, 2-methyl-1-nitro-	20.0	**354.80**	ppbv
66407-26-9	Cyclopenta[c]pyran-1,3-dione, 4,4a,5,6-t	20.4	**142.93**	ppbv
625-74-1	Propane, 2-methyl-1-nitro-	20.5	**523.78**	ppbv
99-82-1	1-Methyl-4-(1-methylethyl)-cyclohexane	20.6	**506.65**	ppbv
103-65-1	Benzene, propyl-	20.6	**373.47**	ppbv
3404-77-1	1-Hexene, 3,3-dimethyl-	20.7	**429.99**	ppbv
None	6-Chloro-2,2,9,9-tetramethyl-3,7-decadiy	20.9	**228.75**	ppbv
7214-61-1	Benzene, (1-nitroethyl)-	21.1	**352.55**	ppbv
498-51-1	2-Heptanone, 6-methyl-5-methylene-	21.4	**178.91**	ppbv
21195-59-5	1,3,8-p-Menthatriene	21.6	**134.58**	ppbv

(IS) is BFB Internal Standard and (SS) are Surrogate Standards that are added to each sample.

1/7/2008 15:30 Page 1 of 1 CLP TIC 07-265-01b.sms

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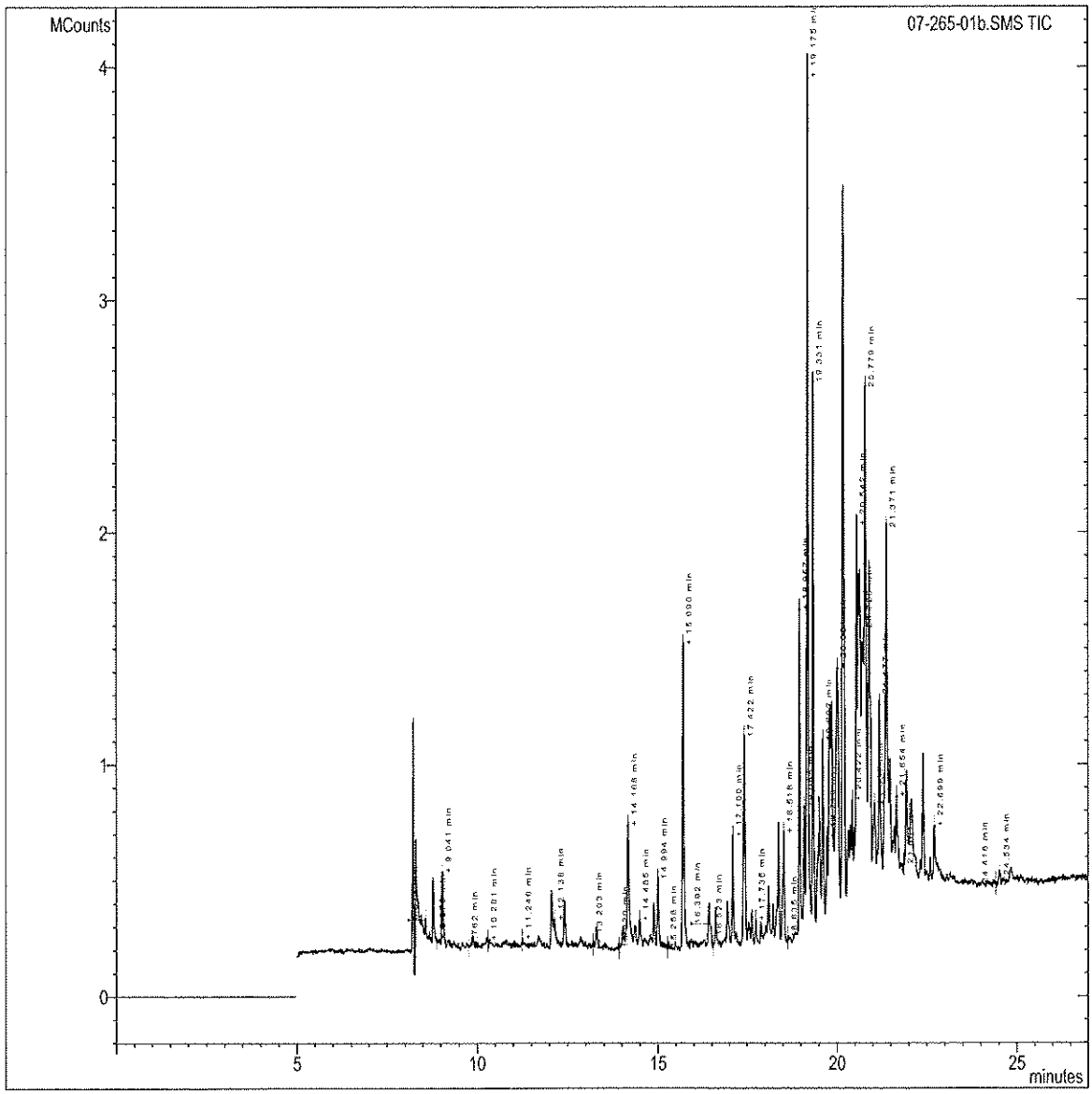

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Chain of Custody Record

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RTPLabs

Client (Billing): SHIELD ENGINEERING
Send Report To Attention:
Phone Number: (704) 394-6913
Fax Number: (704) 394-6968
Date: 12/20/07
Page 1 of 1
Address: 4301 TAGGART CREEK R
E-Mail: dwallace@shieldengineering.com
City: CHARLOTTE, NC 28208
State:
Zip Code:
Contract/Purchase Order No.: 1070249
Project Name: FORMER McDOWELL COUNTY LANDFILL
RTP Labs Project Tracking Number: 07-265

Comments:

	Sample ID No. & Description	Date Sampled	TIME AM PM	Matrix: Air: Ambient	Matrix: Air: Source	Matrix: Liquid/Solid	Compliance Test	Preservatives	# of Containers	Requested Analyses: SEE ATTACHED QUOTE FOR ANALYSES	Sulfurs, Fixed gases	Siloxanes by GC/MS	TO-15 VOCs	Air Samples Summa Canisters Vacuum or Pressure: Field Initial	Field Final	Lab Receipt	Lab Final psig	Tracking # Sample Fraction
1	MDLF-1	12/20/07	1630		X				3	X	X	X	X	Tedlar bags				01.
2												X		XAD-2 sorbent (Siloxanes)				02
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Turn Around Time Requested for Report: Business Days; *Rush Multipliers (Xx)
☐ 1 day*(4x) ☐ 2 days*(3x) ☐ 3 days*(2x) ☐ 5 days*(1.5x) ☐ 10 days*(1.1x) ☐ 15 days

Data Pack: Std ☐ Full ☐ 1.1x surcharge
Electronic Deliverable: ☐ 1.1x surcharge

QC Requirements: Screen ☐ Standard ☐
EPA Level IV for Compliance ☐
Requires approved QAPP sent to lab

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[signature]	12/20/07	20:00	Alston Sykes	12/21/07	11:00 AM

File: chain RTP doc/als revision 4/24/2007